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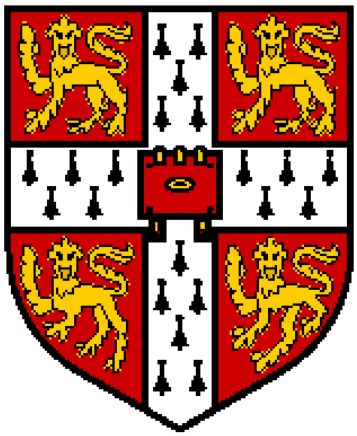
A Phenomenological Enquiry of Perceived Mental Representations in Thematic Musical Improvisation: Case Studies of Two Professional Pianists



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Abstract

A Phenomenological Enquiry of Perceived Mental Representations in Thematic Musical Improvisation: Case Studies of Two Professional Pianists

This study presents a phenomenological enquiry of two professional music improvisers' perceived mental representations. The notion of perceived 'mental representations' are recognized as having a pedagogical importance in increasing the quality of a musical performance, yet its nature and roles in music learning remain poorly understood. Although they are generally seen as conscious and quasi-perceptual experiential phenomena involving the imagination of events, objects, and settings, music scholars have found 'mental representations' difficult to conceptualize due to the coexistence of its different names and definitions in the literature. Synonymous terms of 'mental representations' also feature in several phenomenological and psychological models of referent-based musical improvisation. These include the concepts of 'tonal imagery' (Pike, 1974), 'representational structures' (Clarke, 1988), and 'analytical representations' (Pressing, 1988). To address this gap, the present study seeks to conceptualize the nature, formation, and roles of mental representations in the context of the musical improvisation process. An overarching research question guided the study: What characterises the nature of improvisers' embodied perceived mental representations before, during, and after a thematic musical improvisation?

The study's qualitative methodology is positioned in constructivism and draws on the theoretical thinking of Andreas C. Lehmann and Marc Leman. In particular, this study adopts Lehmann's (1997) theory of three necessary types of mental representations in an expert musical performance (1. the desired performance goal, 2. the production aspects, and 3. the actual performance) as a theoretical lens to understand how the improvisers' mental representations are used. In addition, Leman's (2010) framework of embodied approach to musical semantics is used to access and understand how the improvisers' mental representations are formed. The research design comprised two phenomenologically informed descriptive case studies of two professional improvisers. A central feature of this study's design was having the improvisers learn a given musical stimulus in order to trace the formation and development of their perceived mental representations before, during, and after their improvisations. In addition, a group of four methods was employed: semi-structured interviews, live musical performance, graphic elicitation, and observation. Data comprising interview quotes, thick descriptions, the improvisers' performances, and their drawings were first analysed separately, and then were brought together and interpreted using a framework informed by the theoretical works of Lehmann and Leman.

The findings of the study are presented in a narrative across two descriptive case studies, showing how the mental representations from Lehmann's model, and Leman's six types of semantics are evidenced throughout the two improvisers' learning, ideation, improvisation, and reflection phases. In particular, the key findings presented four ways of meaning constructions during the improvisers' formation of their mental representations, and identified twelve types of goal, production, and reflection-based mental representations. Bringing the two cases together, the study concludes that the two professional improvisers' mental representations: (1) are multi-various in nature, (2) undergo progressive and distributive formations, and (3) take on multiple types of roles. In addition to pedagogical recommendations to music education, the study's methodological contribution lies in providing a reference point and common ground for locating and describing the different phenomena taking place during improvisation – 'mental representations' being just one of them.

DECLARATION

This dissertation is the result of my own work and includes nothing which is the outcome of work done in collaboration except where specifically indicated in the text.

STATEMENT OF LENGTH

This dissertation does not exceed 80,000 words, excluding the title page, content pages, captions, footnotes, boxes, references, bibliography, appendices, and acknowledgements.

Table of Contents

List of figures

List of tables

List of boxes

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PART I: INTRODUCING & CONCEPTUALISING 'MENTAL REPRESENTATIONS'

Chapter 1: Introduction

1.1 Prologue and personal background

In the context of western art music, the improvising musician's ability to take a given musical theme and, with little or no preparation, spontaneously create from it astonishingly complex improvisations, has long fascinated audiences for hundreds of years (Hamilton, 2008). In the contemporary concert scene, pianist Gabriela Montero, among others[1], represents a living tradition of this richly historical practice. To counter any scepticism towards the spontaneity of her improvisations, Montero always requests for a given (and often unfamiliar) theme[2], which is enthusiastically sung to her by audience members. As such, the brief period that Montero takes to memorise and familiarise herself with each new theme, provides a unique opportunity to glimpse into a fleeting and hidden world teeming with learning and brainstorming activities. The brainstorming phase, in particular, showcases Montero's aural[3] and motor skills, as well as her musical, theoretical, and cultural[4] knowledge.

During these brief-learning periods, Montero generally starts by playing a part or all of the melody several times over in varying tempos, dynamics, and articulations. She then proceeds to harmonise the melody in different ways, while also playing it in different registers on the piano[5], sometimes returning again to focus on just the melody[6]. These learning periods could last between thirty-seven seconds to almost two minutes[7], depending on the length of the given theme, which can vary between ten to thirty seconds. Most importantly, when Montero begins to improvise, the audience gradually learns what parts of a given theme she has chosen to feature in her improvisation, as well the parts she has chosen to omit. In Nettl's (2009)

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[1] Other contemporary classically trained improvising pianists include the late Richard Grayson, Robert Levin, and Johanna McGregor, among many others.
[2] Montero shares her reasons for requesting unfamiliar themes from the audience (16:55) https://www.youtube.com/watch?v=fkXG-2LukrE
[3] Montero occasionally revises her aural representation of the given theme. As seen at 0:50 in https://www.youtube.com/watch?v=QUqhPoA5bIY, the B-flat note that Montero had played by ear while learning the D major theme was later omitted in the actual performance.
[4] See Montero improvise on a theme from the third piano concerto by Sergey Rachmaninoff in the style of a tango: https://www.youtube.com/watch?v=2EgwVlsV_Ak
[5] See example of Montero learning a ten-second theme from *Harry Potter* (17:55) https://www.youtube.com/watch?v=fkXG-2LukrE
[6] See example of Montero learning a ten-second theme from *Gone with the wind* (beginning) https://www.youtube.com/watch?v=PyER5c7maVQ
[7] See example of Montero learning a thirty-second theme (beginning) https://www.youtube.com/watch?v=QUqhPoA5bIY

words, then, what is "the relationship between some point of departure learned by an improviser and the product that is created in the course of performance"? (p. xi)

This research interest had developed from my own experiences as a pianist participating in weekly jazz 'improv' classes during my middle and high school years. Despite having relatively strong aural skills and the ability to reproduce from memory all the notes on the lead sheets, I was unable to improvise, and often dreaded my turn to improvise solos. Even then, I knew that my understanding of the given music was lacking in many areas of theoretical and practical knowledge. As I continued into my higher music education in classical piano performance, I became more aware that, unlike improvisers, my "mental map" (Noice et al, 2008: 74) of a Beethoven piano sonata, for instance, supports only the reproduction of the same performance each time, and are likely different, or less complex than the ones constructed by improvisers, like Gabriela Montero.

Indeed, as Lehmann (1997) has pointed out, "the mental representations that allow successful performance of rehearsed music may be different from those that facilitate…improvisation" (p. 143-144). However, relatively little attention has been paid into researching the mental representations of improvisers (Noice et al., 2008; Lehmann, 1997), despite a growing interest to incorporate more improvisation into lower and higher music education (Campbell, 2009). The rationale for the present study is thus built upon this research gap and the timeliness of the enquiry (Tracy, 2010: 840). The rest of this chapter, then, introduces the concept of improvisers' mental representations within the practices of thematic-based musical improvisation, and concludes with an overview of the thesis structure.

1.2 Practices of thematic-based musical improvisation

Musical improvisation occurs as a 'cross-cultural phenomenon' (Campbell and Teicher, 1997) and is a widespread practice across many music genres (Solis et al., 2009: xi). The term 'improvisation' derives from the Latin word *improvisus*, which means 'unforeseen' (Oxford English Dictionary, 1996: 499). As a concept, the term 'improvisation' holds a multitude of meanings and practices across different musical cultures, including the genres of jazz, rock, pop, flamenco, Indian, and western art music (Bailey, 1992). Nettl (2009) even states that, "we probably never should have started calling it "improvisation"" (p. ix), due to the vast span of musical practices that this term has sought to cover.

> "But it has gradually become clear that the things that we call improvisation encompass a vast network of practices…It concerns everything from the organist who can make up a Bach-like fugue on the spot to the keyboardist who plays literally without having much of an idea of what will come out of his instrument…It includes the jazz musician who learns his art by listening to and memorizing recorded improvised solos, and the composer of classical music who played something, found that he liked it, and quickly wrote it down." (Nettl, 2009: xi).

Indeed, this eclectic array of scholarship reflects Bailey's (1992) observation of how "improvisation enjoys the curious distinction of being the most widely practised of all musical activities and the least…understood" (p. ix). However, it also shows scholars' many attempts at understanding the nature of improvisation and its processes from different perspectives. In particular, much of the improvisation literature has focused on the similarities between improvisation and composition. The act of composition, which derives from the Latin verb '*componere'* meaning 'put together', is musically defined as 'the activity or process of creating music' (The Grove Dictionary of Music and Musicians, 1954). The rationale for their close relationship is that improvising and composing fundamentally share the same creative process. Nettl (2009), for instance, discusses the progression of research into the relationship between improvisation and composition.

> "Improvisation first found its role in association with performance practice studies, then as a kind of component of aural composition…and eventually as the opposite of composition." (Nettl, 2009: x)

This view suggests that the practices of improvisation and composition can be regarded as part of the same continuum that represents different facets of the same process (Nettl, 1974; Alperson, 1985; Sloboda, 1988). Both activities involve combining whole or parts of musical ideas to form a piece of music, although improvisation instantaneously executes these ideas with greater degrees of spontaneity. In this regard, Berliner (1994) explains how improvisation has been studied as a type of instant musical work, as well as a process:

> "When players use *improvisation* as a noun, referring to improvisations as artistic products, they typically focus on the products' precise relationship to the original models that inspired them…When artists use *improvisation* as a verb, however, they focus not only on the degree to which old models are transformed and new ideas created, but on the dynamic conditions and precise processes underlying their transformation and creation." (Berliner, 1994: 221)

In particular, the "original models" that inspire these instantaneous compositions refer largely to the use of a given theme in an improvisation. The practices of thematic-based

improvisation are especially prominent in the historical literature on western art music. Many composers, including Johann Sebastian Bach, Wolfgang Amadeus Mozart, Ludwig van Beethoven, and Franz Liszt, were known to be exceptionally skilled improvisers (Sloboda, 1988; Hamilton, 2008). Multiple anecdotal evidence have described how these composers often used a given theme in their improvisations to demonstrate "stylistic competency" (Hatten, 2009: 281), or knowledge of a specific musical style by playing with or against a stylistic framework (Hamilton, 2008). Indeed, the genre of western art music has enjoyed a well-documented history of improvisation for over nine centuries (Ferand, 1961: 5), although the teaching and practice of this performance activity has ceased significantly since the beginning of the twentieth century (Levin, 2009: 143-144). Contemporary organists, as an exception, still practice thematic-based improvisation, which involves improvising on given hymns or themes in congregations, concerts, as well as in competitions (Johansson, 2012).

The practices of thematic-based improvisation can also be found in the jazz (Sudnow, 2001) and popular music genres (Bailey, 1992), where musicians improvise on a given tune or harmonic progression, or within the performance of a song. Rock guitarists from *The Grateful Dead*, for instance, used thematic-based improvisation[8] in their performances during the 1960s and were greatly influenced by jazz and Indian classical music (Bailey, 1992: 39). In addition, the use of a given theme provides a common starting point between the improvisers and their audience, which enables listeners to feel engaged in the process and development of the improvisation.

> "Audiences who appreciate improvised music have a strong expectation that they will hear…novel versions of previous pieces that have been transformed in some way, and evaluate what they hear in those terms. Performers may, for example, keep a rhythmic, metrical, or harmonic framework in mind while varying the rhythms or pitches of a familiar melody; or may focus on features of a particular image while populating an emergent piece of music with impromptu musical utterances as they occur to them." (MacDonald et al., 2012: 246)

MacDonald et al. (2012) also refer to improvisers' uses of "a particular image" or mental representation while improvising on a given theme or subject. Defined succinctly as "the deliberate use of imagination by musicians" (Clark et al., 2012: 351), examples include Franz Liszt improvising glissandi to illustrate an audience member's request for "the railroad"

[8] In addition to using the stanzas and choruses of the lyrics, the rock guitarists' thematic-based improvisations are commonly governed by particular harmonic progressions.

(Hamilton, 2008: 50), or guitarist Steve Howe improvising "a slightly melancholy beginning" in *Tales from Topographic Oceans* (Bailey, 1992: 41). As these examples illustrate, improvisers' mental representations are richly multimodal, and may feature a combination of musical, emotional, visual, theoretical, and other associations (Berliner, 1994). In addition to its facilitation in conveying musical expressions, mental representations play a fundamental role in the improvisation process of several genres. Indeed, Johansson (2012) cites Pressing's (1988) presence of "internal images" (Pressing, 1988: 145) as a similar characteristic between the learning of jazz and organ improvisation (Johansson, 2012: 226).

1.3 Improvisers' mental representations in music learning

The practices of thematic-based improvisation often require improvisers to first learn new music material (Noice et al., 2008), which may take place sometime or immediately before an improvisation. As Finney (1987) notes, "emphasis is placed upon memorising materials that will make it possible for improvisation to take place. The materials constitute building blocks…[and] are seen as the establishment of a basic grammar" (p. 18). Although the complexity of the new music material, and the extent to which the details of the music are thoroughly learned can vary[9], improvisers must nevertheless construct a "mental map", or a mental representation of a new piece that will support a different performance each time (*ibid.*, p. 64, 74). This implies that improvisers might learn and "kno[w] [music] in an improvisatory way" that is different from, for example, non-improvisers (Goldman, 2016: 100). Considering the significance of thematic-based improvisation practices across several music genres, however, there is relatively little research that has studied how improvisers learn new music. In addition, apart from the handful of recent empirical studies on the subject (see Johansen, 2017; Nielsen, 2015; Watson, 2015), scholars have yet to examine improvisers' learning of

[9] See, for example, the following video examples showing the different types of musical stimuli audience members have offered to pianist Gabriela Montero to improvise on. These videos also show what parts of the music Montero had chosen to memorise or focus on in different performing contexts (e.g. during public concerts or in a private recorded session):
https://www.youtube.com/watch?v=fkXG-2LukrE: (17:55) Montero learns the entire 10 second long melodic theme from the film *Harry Potter*, sung by two audience members.
https://www.youtube.com/watch?v=QUqhPoA5bIY: (Beginning) Montero learns the last phrase of a 35 second long melody, sung by the audience.
https://www.youtube.com/watch?v=PyER5c7maVQ: (Beginning) Montero learns the entire 9 second long melodic theme from *Gone with the wind*, sung by an audience member.
https://www.youtube.com/watch?v=SUV-zwI5S5c: (Beginning) Montero learns both the melody and the harmony of a 20 second long stimulus taken from *For the longest time* by Billy Joel.
https://www.youtube.com/watch?v=4-wAeOimML0: (Beginning) Montero learns both the melody and the harmony of a 15 second long stimulus taken from *Brazil* by Antonio Carlos Jobim.

new music in relation to an actual improvisation performance. Indeed, Nettl (2009) has highlighted the importance of studying both the 'product' and 'processes' of improvisation in order to shed more light on our current understanding of this complex phenomenon.

> "The mainstream discourse of scholarly literature about improvisation has revolved around three questions: (1) whether something is properly improvisation, and how we can find out; (2) the relationship between some point of departure learned by an improviser and the product that is created in the course of performance; and (3) the methods of combining, juxtaposing, and otherwise arranging building blocks to create music…We wish to know what these building blocks have in common, and how the differences reflect fundamental guiding principles of their cultures." (Nettl, 2009: xi-xiii).

Among the three questions posed by Nettl (2009), this study focuses on the second and third enquiry. First, it explores the relationship between what an improviser[10] has learned[11], and the music that is improvised. A way to investigate this relationship is by looking at how improvisers form their mental representations of a given musical stimulus and then use them in their improvisations. The notion of 'mental representations', however, is difficult to conceptualise, which is partly due to many ways musicians use them in different contexts (Dalagna et al., 2013). Furthermore, existing theories from other fields on the formation and roles of mental representation[12] have yet to be applied to the context of music learning.

At the same time, the field of music education research has shown a growing interest in developing students' abilities to create efficient mental representations in music learning (Holmes, 2005; Keller, 2012). Previous studies have suggested that a key difference between music students and professional musicians lies in the latter's "ability to create a mental representation as an artistic desired outcome" during performance planning (Dalagna et al., 2013: 830). As such, several scholars have raised the importance of encouraging students to learn from professional improvisers (Lehmann and Ericsson, 1997; Norgaard, 2008; Berliner, 1994). Thus, one way to learn more about improvisers' mental representations is to study how professional improvisers acquire them in the first instance, as Lehmann and Ericsson explains:

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[10] As a starting point, this study focuses on the mental representations of individual improvisers in a solo improvisation context. The rationale is to reduce the number of variables to a manageable amount within the logistics of studying two immensely complex phenomena (1. improvisers' mental representations and 2. the improvisation process) at the same time. Once a conceptual understanding of the topic has been established at the solo level, the aim is to continue a similar study in a group improvisation context.

[11] Thus, examining the role of a given musical stimulus is an important consideration for this study. It can be argued that even if no stimulus is provided in the research design (see Section 3.3.2), improvisers will inevitably come up with their own stimulus, a point that was brought up at my upgrade viva.

[12] See Millon (2003), Hall (1997), and Gollwitzer (1999).

> "We believe that further advances in our understanding of music performance learning will depend greatly on future studies of the mental representations that experts are able to develop in relatively optimal learning environments. Not until we understand how these representations can be acquired…can we seriously discuss potential implications for public music education." (Lehmann and Ericsson, 1997: 55)

Second, this study focuses on Nettl's (2009) third enquiry concerning improvisers' "methods of…creat[ing] music" (Nettl, 2009: xiii). A way to investigate this is to look at how improvisers create ideas in different ways (Hargreaves, 2012a) through their mental representations. According to Pressing (1988), "some fundamental…questions remain about the origin of certain kinds of decision making [in improvisation]" (p. 168). As such, researchers are continuing to look for ways to identify a common element or unit that can bring together these various understandings of improvisation within and across different musical contexts. Furthermore, Norgaard (2008) asserts that, "the later stages of improvisatory development and the models of the thought processes guiding improvisation have not been systematically investigated" (p. 44). Although scholars have researched into the earlier stages and development of improvisation skills (McPherson, 1993; Kratus, 1995), as well as children's experiences of improvisation (Flohr, 1981; Burnard, 1999; Kanellopoulos, 2000), "no experimental research has been conducted to specifically validate the [improvisation] models" that describe the processes of professional improvisers[13] (Norgaard, 2008: 44). This study, then, seeks to "learn more about how the minds of [professional] improvising musicians work" (Nettl, 2009, p. xiii) through their perceived experiences of learning and creating music in the context of a thematic-based solo improvisation.

Considering, then, the multitude of theoretical works[14] suggesting the involvement of mental representations during the improvisation process, the shortage[15] of empirical studies necessitates further research on the nature, formation, and roles of such mental representations. In order to understand the "essential components" of these mental representations, it is also necessary to study skilled improvisers' "multiple ways of knowing" both "during and beyond musical performance" (Davidson and Scripp, 1992: 395). Following the footsteps of Kenny and Gellrich (2002) and Norgaard (2008), this would include more research on how skilled improvisers learn new music, and how they recall what was improvised. In particular, the

[13] According to Norgaard (2008), these include the theories and cognitive models that were developed by Pressing, (1988), Clarke, (1988), Kenny and Gellrich (2002), and Johnson-Laird (2002)
[14] See Pressing (1988), Clarke (1988), and Pike (1974), among others, in Sections 2.2 to 2.4.
[15] See p. 91 in Chamblee (2008)

present study agrees with Finney (1987) in that: "reveal[ing] the dynamics of [the musician's] learning process…will be important in finding out how and why aesthetic responses are made [and] how musical life is known and experienced" (p. 9). Similarly, Bjerstedt (2015) calls for "the need for a multivariety of jazz learning aspects" (p. 508). As such, studying how improvisers learn music is as important as studying how they improvise. However, given that mental representations are phenomena that cannot be directly observed (Godoy and Jorgensen, 2001), the experiences[16] of improvisers, and the meanings that they construct[17], provide several forms of access (among others) to study them (Leman, 2010a). In the following chapter, then, this study makes the case and argues for the study of professional improvisers' perceived mental representations through their meaning constructions.

1.4 Overview of the thesis

In order to investigate professional improvisers' perceived mental representations, this thesis is divided into seven chapters. The introduction Section in ***chapter one*** has presented several perspectives on musical improvisation. In particular, a review of the scholarship on the similarities and differences between the processes of improvisation and composition has shed light on the ambiguity of the concept of 'musical improvisation'. In addition, the focus of the present study was shaped by several on-going areas of research into the relationship between what an improviser has learned, and the improvised music, and the origin of decision-making during the improvisation process. Furthermore, the present study narrowed the scope to examine *professional* improvisers' experiences, due to a lack of empirical studies on the later stages of improvisatory development.

Chapter two begins by introducing the notion of professional improvisers constructing 'mental representations' from their learning and performing experiences. This is followed by a conceptualization of 'mental representations' as an embodied structure in the formation of musical meaning, which features a framework of embodied musical semantics by Marc Leman (2010). Next, a model of expert musicians' 'acquired mental representations' by Andreas C. Lehmann (1997) is introduced in order to situate Leman's framework in the context of improvisation performance. Leman's framework and Lehmann's model are then

[16] In particular, through a phenomenological approach (Leman, 2010), as will be argued for in chapter two.
[17] Indeed, several scholars across different fields, including Leman (2010a; 2010), Hall (1997), and Millon (2003), among others, have established the role of mental representations in the process of meaning formation.

used together as intersecting frames to conceptualise three kinds of mental representations, drawing from several theories of music improvisation in the literature. In particular, two cognitive models of improvisation by Pressing (1988) and Clarke (1988), and Pike's (1974) phenomenology of jazz are critically examined alongside empirical sources of ethnographic and phenomenological studies. This chapter concludes with a statement of the following research questions that have emerged from the literature review.

What characterises the nature of improvisers' perceived mental representations before, during, and after a thematic musical improvisation?

1) Drawing on Leman's (2010) framework of "embodied approach to music semantics", how are meanings implicated in the formation of mental representations?

2) How is Lehmann's (1997) model of "acquired mental representations in music performance" evidenced in terms of the roles implicated in their improvisations?

These questions, which are framed by the theoretical thinking of Leman (2010) and Lehmann (1997), aimed at acquiring a deeper understanding of the nature of three kinds of mental representations that may be constructed by professional improvisers during their experiences of learning and performing improvised music, and how they are formed and used in real practice.

Chapter three presents a justification of the methodology and methods that were employed to examine professional improvisers' constructions of their 'mental representations'. The chapter starts with a reflection of the inherent assumptions underpinning the research questions, and argues for the interpretative-social constructivist epistemological position of the present study. Building on this foundation, a qualitative methodology is presented, where a rationale is provided for adopting an interpretative phenomenological analysis (IPA) approach devised by Smith et al. (2009). The chapter then moves to justify a phenomenologically informed multiple case study, wherein the choices of IPA-informed methods of observation, and semi-structured interviews embedded with graphic and musical elicitation tools are presented. Finally, the chapter turns to consider issues in the research design, which include the lessons learnt from the pilot study, ethical considerations, the adopted analytical procedures, and the issues of reliability and trustworthiness in the data analysis.

Chapter four presents the findings from the first descriptive case study on Stuart Jones, a professional improvising musician, composer, and music teacher from Birmingham, U.K. This chapter is divided into six Sections. It begins by introducing Stuart and the interview setting to provide a clearer understanding of the context in which this interview had taken place. The first set of findings focusing on Stuart's constructions of mental representations during the learning stage is presented next, reporting on the process of his memorisation and reproduction of the given musical stimulus. This is followed by a report of the findings from the ideation phase, which focuses on the mental representations that Stuart had constructed while generating his ideas from the given musical stimulus prior to his improvisation. The findings from the improvisation phase are reported next, which features three kinds of mental representations that Stuart had constructed while being engaged in four different activities during his improvisation performance. Lastly, the findings from the reflection phase, which were mainly drawn from the analysis of Stuart's drawings, reports on Stuart's perceived understanding of the given musical stimulus and his improvisation performance. The chapter concludes with a summary of the different kinds of mental representations that Stuart had formed and used across the four phases.

Chapter five presents the findings from the second descriptive case study on Ron Drotos, a professional improvising pianist, music teacher, composer, and conductor from New York City, U.S.A. Like chapter four, this chapter is divided into six Sections. Similarly, it begins by introducing Ron, and in this case, the setting of the virtual interview that had taken place over Skype™. The structure of this chapter from there on follows that of chapter four, where the findings from Ron's four phases of learning, ideation, improvisation, and reflection are reported and then summarised.

Chapter six discusses the key findings from the two descriptive case studies in chapters four and five to answer the research questions. Divided across five Sections, the first section addresses the first research question, reporting the improvisers' meaning construction processes during the formation of their perceived mental representations. The next section addresses the second research question by reporting the various types of mental representations and their different roles that were identified across the four phases of learning, ideation, improvisation, and reflection. This is followed by the third section, which addresses

the overall research question by presenting a preliminary model illustrating the key features that characterise the nature of the improvisers' perceived mental representations.

Chapter seven presents the conclusions, drawing on the discussion of the key findings to consider the nature, formation, and the roles of the two professional improvisers' perceived mental representations. The study concludes that the improvisers' perceived mental representations are (1) multi-various in nature, (2) undergo progressive and distributive formations, and (3) take on multiple types of roles. This chapter then considers the implications of the conclusions and offers three recommendations, before moving to acknowledge the contributions and the limitations of the study. The chapter closes with an epilogue featuring the final reflections of two improvisation lessons that the author had taken with Ron Drotos towards the end of this study.

Chapter 2: Mental representation in meaning formation

Having provided a rationale in chapter one for studying professional music improvisers' perceived mental representations, chapter two situates the present study in the existing research on musical improvisation. In particular, this chapter introduces the concept of 'mental representations' in the context of improvisers' experiences of learning and performing new music. Throughout this chapter, Leman's (2010) framework[18] and Lehmann's (1997) model[19] are used as intersecting frames to conceptualise the notion of 'mental representations' in the musical improvisation process, and to present a critical discussion of the theoretical and empirical literatures. This chapter concludes with a summary of the key gaps in music improvisation research, and a statement of the study's research questions that elaborate on a conceptualisation of improvisers' 'mental representations' to address several of these gaps.

2.1 Improvisers' experiences and thought processes

Previous research examining the process of musical improvisation have often involved studying improvisers' first-hand experiences in order to better understand the phenomena of improvisation itself (Benson, 2003: xi). Norgaard (2008), for instance, investigated the thought processes of seven professional jazz improvisers. His aim was to portray improvisers' performing experiences based on their descriptions of strategies that were employed during their improvisations. In particular, his findings identified four strategies: (1) Recalling and inserting learned ideas during improvising, (2) Choice of notes based on harmonic priority, (3) Choice of notes based on melodic priority, and (4) The repetition of previous ideas.

Scholars have also sought to better understand improvisers' experiences by studying the metaphors that improvisers use to describe their experiences. Campbell (1991b), for instance, provides several examples of improvisers' metaphorical descriptions.

> "Improvisation may be more than the sum of its component colloquial explanations: 'To wing it,' to 'make it up', to 'blow it out,' to let ideas tumble out on specific preparation or pre-meditation. It is the musical response to an unpredictable impulse or feeling. It is the intricate balance of performance and composition, all at once." (Campbell, 1991b: 21)

[18] Marc Leman's framework, *Embodied Approach to Musical Semantics* (2010), will be introduced in Section 2.1.2.
[19] Andreas C. Lehmann's model, *Acquired Mental Representations in Musical Performance* (1997), will be introduced in Section 2.1.3.

Such metaphors, then, illustrate how improvisers must navigate the tension between "mak[ing] it up" during a live performance and the "specific preparation" that went into the music.

Similarly, Burnard (1999) studied children's experiences of improvising and composing from a phenomenological perspective, drawing from Van Manen's (1990) approach on researching lived experiences. The multi-method approach of her study, which adopted an ethnographic strategy, took place in a naturalistic setting. Burnard established a six-month long intervention in the form of a voluntary after-school musical club with eighteen students. Throughout the weekly meetings, Burnard acted as a facilitator and observed while the children took part in self-directed solo and group musical activities. Similar to Campbell's (1991b) account of how improvisers let "ideas tumble out" (p. 21), one of Burnard's findings suggested that the timbre of a sound was a significant factor in forming musical ideas: "When you like the sound, ideas fall out" (p. 143). Other findings suggested that while improvising, these children often reported having multi-sensorial experiences and focused on how to "communicate intentions in an ongoing dialogue with sound" (p. 316). As such, the intellectual, social, and physical dimensions of improvisers' lived experiences are important considerations for developing a better understanding of their thinking processes.

The notion of 'lived experiences' also places emphasis on understanding the nature of improvisation through an improviser's 'reflective perspective', or "the consciousness of what we perceive to be the meaning of a phenomenon" (Burnard, 1999: 79). In this regard, phenomenological investigations of the improvisation process include studies by Nardone (1996), Custodero (2007), and Kingscott and Durrant (2010). In particular, Nardone's (1996) study explored the improvisation experiences of three professional improvisers from a phenomenological-psychological perspective, drawing from the thinking of Edmund Husserl, Maurice Merleau-Ponty, and Amedeo Giorgi. Her study was guided by the following question: "What is the range and structure of their experience of improvisation?" (*ibid.*, p. 68). Nardone distilled the improvisers' reflections of their experiences into eleven constructed meanings, which she termed as 'lived meanings'. Some of these 'lived meanings' include: 1. Incorporating familiar and unfamiliar musical ideas and styles, 2. Using a narrative device to develop the improvisation, and 3. Drawing inspiration from musical and physical sources. Many of these 'lived meanings' reflected different strategies that were used by the improvisers. Furthermore, the improvisers' constructions of their 'lived meanings' were often

tied to a particular piece, or a particular performance of a piece. Berliner's (1994) ethnography study also reported similar examples of lived meanings in the experiences of jazz improvisers.

> For improvisers, the meaning of a piece incorporates layers of nuance derived from intimacy with its imagery, its rhythmic and tonal associations, its performance history, and its relatives within the wider repertory of pieces. Among the myriad resources that soloists filter through their imaginations, one of the most striking is the vibrancy of the human connections that inhabit the piece – myriad inflections, personalities, voices, fingerings, and stances, coursing through the mind and into the musical performance. Such varied imagery informs and deepens every story in the telling.' (Berliner, 1994: 204)

In particular, Berliner points out the presence of 'varied imagery' within one's experiences, suggesting that improvisers' imaginations hold a synthesis of various meanings associated with a particular piece of music, where each performance of it "deepens every story in the telling" (*ibid*). These *imageries* and their assigned meanings of a piece are multimodal in nature, which include "its performance history…and the vibrancy of the human connections that inhabit the piece" (*ibid*). Such images, then, play a role in projecting an improviser's multitude of meanings into an improvisation performance, meanings that are translated into "myriad inflections, voices, and fingers" (*ibid.*).

However, Berliner's account also brings forth the question of how these *imageries* and their meanings are constructed in the first instance. In considering Nettl's (2009) call for a better understanding of the relationship between what the improviser has learned and the music that was improvised, in what ways are an improviser's *imageries* of a piece constructed from "its performance history, and its relatives within the wider repertory of pieces"? (*ibid.*) This question is considered in more detail in the next subsection.

2.1.1 Introducing 'mental representations'

When we listen to an improvisation on a given theme, we may likely hear parts of the improvisation that sound both familiar and new in relation to what we know and remember of the original tune. Similarly, we may ask, what do improvisers themselves remember about the original tunes they are playing before they start to improvise on them? And how might their understanding of the original tune help to guide their improvisations and inspire musical ideas?

When we first hear a tune, most of us will remember its general essence, or the aural 'gist' (Dowling and Harwood, 1986). However, when it comes to performing a particular piece, musicians, including improvisers, need to know more than just the 'gist' of the music. In addition to knowing what the piece sounds like, musicians must also consider other components that are involved in a musical performance and develop strategies to remember them (Hallam, 2006: 97). An improviser's grasp of a piece is often constructed into a 'mental map' (Noice et al., 2008: 64, 74), or *mental representations* of pre-planned performance cues for almost every sound, feeling, and physical gesture (Chaffin et al., 2006: 206).

On this matter, several studies have investigated how improvisers come to understand a tune prior to improvising on it. Jazz musicians, for instance, perform and improvise significant variations to a 'standard' song each time it is played (Berliner, 1994; Sudnow, 2001). Jazz improvisations commonly start with the musicians playing through the original melody one time, before going on to create new melodic substitutions in real time over the repeating the chord sequences of the accompaniment (Sudnow, 2001: 6)[20].

According to Noice et al. (2008), who had studied the music memorisation strategies of a jazz pianist, the learning process by the jazz pianist appeared to be very similar to the approach reported by classical musicians. The pianist was presented with the musical score of an unfamiliar piece, and was instructed to learn and rehearse the piece to a performance standard in two timed sessions (15 and 30 minutes) that took place ten days apart from each other. The findings showed that the musical structure of the piece was used as a retrieval scheme, and salient features of the music served as cues to guide the performance. The pianist also reported perceiving imageries and metaphorical associations in the later stages of learning. These findings, however, were not studied in relation to the jazz pianist's ability to improvise on the piece.

In addition, the practice of organ improvisation, which can be traced back to as early as 1541 in Venice (Ferand, 1961: 11), also offers insights into how improvisers learn new music. In general, there are two types of organ improvisation: (1) liturgical improvisation and (2) concert improvisation. In both cases, organists often need to familiarise themselves with a

[20] As Pike (1974) also notes: "Basically there are two kinds of improvisation: *free* and *controlled.* Completely free improvisation is possible only when the creative processes are able to function without the aid of memory…Controlled improvisation, on given musical material, is more common." (Pike, 1974: 93).

hymn or prewritten piece of music first, and moreover must frequently do so on short notice. The fast-paced nature of this improvisatory practice raises interesting questions about how organists construct their understanding of a new piece of music in these two different performance contexts.

Johansson (2012: 228), for instance, notes that liturgical improvisations are performed during church services, where organists may play a light re-interpretation of published hymns. On the other hand, concert improvisations are designed to showcase an organist's improvisation skills, which can be seen in several organ competitions[21]. In particular, candidates are assigned musical themes without advanced preparation, and are expected to perform an improvisation featuring the given theme within strict rules, such as demonstrating particular techniques and adhering to specific time limits (Chamblee, 2008)[22].

However, in both cases, organists need to consider the salient features of the music to improvise on, as well as ways to convey the atmospheric and emotional characteristics of the piece that are appropriate to the given moment. For instance, Johansson (2012) states that the range of factors that organists have been known to consider in their approach to improvising can be grouped into four concepts which are positioned across a continuum: (1) improvisation as edition, (2) extemporisation, (3) expansion, and (4) instant composition.

The first concept, 'edition', refers to the role of the score acting as a blueprint for the improviser, who treats it as a guide to help organise the accompaniment for the hymn, and encouraging people to sing in the liturgy. Next, 'extemporisation' refers to how improvisers depart completely from the score, and instead, treats only a part of the hymn in a popular method based on a traditional praxis of organ improvisation. Its function is to inspire people to sing by presenting the main melody in an appropriate atmospheric setting. Meanwhile, 'expansion' is an improvisatory approach where the organist, from extensive studying of a piece of music, has been able to extract the key characteristics that identify a particular piece, and to form more abstract categories of different musical styles. It is here where the organist starts to form her own musical vocabulary. Lastly, improvisation as 'instant composition'

[21] Among others, notable competitions include Le Concours International D'Orgue, Grand Prix de Chartres (France), St. Albans International Organ Festival (U.K.), and the American Guild of Organists, National Competition in Organ Improvisation (U.S.A.).

[22] In concert improvisations, organists may adopt a looser performance approach by expanding on and departing from the original harmonies and forms to create a 'freer' type of improvisation (Johansson, 2012).

refers to the point where the organist draws on the wealth of his musical vocabulary and experiences to create a free improvisation, drawing on personal storytelling as an inspiration (Johansson, 2012: 223-225). Thus, each concept offers an improvising approach that serve different functions in various performance contexts in relation to the original music score.

These different scenarios described in organ and jazz improvisation show that improvisers across various performance contexts often encounter the necessity of having to learn a given musical piece prior to improvising on it. As such, several studies have introduced an unfamiliar stimulus to participants in order to examine the relationship between improvisers' musical memory of a piece and their improvisations[23]. For instance, Ockelford (2012) introduced an unfamiliar piece of music to a musical savant blind jazz pianist named Derek. In particular, Ockelford played an audio recording to Derek, and like Noice et al. (2008), he observed the strategies that Derek employed to aurally memorise and recreate the piece. According to Ockelford, "the music […produced] following exposure to musical input – specifically the manner in which their responses can be considered to derive from or be influenced by the stimuli with which they are presented – provides powerful evidence of the mental processing involved" (*ibid.,* p. 32).

More importantly, Ockelford's study highlighted the importance of developing strong aural skills in music learning and improvising. Derek's ability to learn new music by ear has also been a long-held tradition in classical music improvisation for which famous composers including Johann Sebastian Bach (1685-1750), Ludwig van Beethoven (1770-1827), and Franz Liszt (1811-1886) were renowned (Hamilton, 2008)[24]. In this respect, music educators, ethnographers, and psychologists have voiced concerns that music listening is often ignored in classrooms (Dunn, 1997); that musicians have become too dependent on learning from

[23] For example, Shockley (1980) had investigated how music improvisation and drawing exercises may help with memorising and sight-reading piano music. Shockley had university piano majors learn and memorise a new piece of music from a score using a drawing and improvising method. This method, which was developed from Gestalt theory, involved three steps. First, the students studied the music score away from the piano. Next, they drew a visual representation of the musical ideas, including any textures and dynamics. The students then used the 'maps' they drew of the piece to perform an improvisation at the piano. Shockley's findings suggested that this improvisation-based approach enhanced students' sensitivity to musical patterns, dynamics, and structures, enabling them to memorise new music faster.

[24] Many centuries later, audiences today remain fascinated by an improviser's rapid memory processes of absorbing, synthesizing, and transforming an aurally transmitted tune into a new piece of music created in real time. We can, for instance, observe how pianist Gabriela Montero rapidly absorbed the Harry Potter 'Hedwig Theme' that was sung to her by the audience, and spent one-minute playing through its harmonic options before improvising on it (see https://www.youtube.com/watch?v=uD_DAUpb1Xg).

sheet music (Berliner, 1994); and how music listening is still an under-researched area despite being a central part of creative music perception (Hargreaves et al., 2012). Thus, the study of improvisers' aural skills during their music learning processes is an important consideration in this study, as it offers an opportunity to observe a highly transient and dynamic process of richly varied responses from different improvisers[25].

To summarise this subsection, improvisers present a unique situation where they first need to learn a piece of music to a performance standard, only to alter it significantly later. This raises interesting questions about how improvisers construct their mental representations of a musical piece they are improvising on, and how their mental representations are used to guide their improvisations (Noice, 2008: 64). To better understand this process, the next subsection presents a conceptualization of 'mental representations', followed by Lehmann's (1997) model of expert musicians' mental representations across various contexts.

2.1.2 Conceptualising 'mental representations'

'Mental representation', also known as 'mental imagination' (Washburn, 1916), 'image schemata' (Johnson, 1987), and more commonly as 'mental imagery' (Leahey and Harris, 2001; Godøy and Jørgensen, 2001), refers to the imagination of objects, events, and settings that did not necessarily happen or exist, and which may not be perceived by the senses (Sternberg, 2009). The term 'representation', which is derived from the Latin term, *repraesentare* ("make present, set in view, show, exhibit, display"), is defined as "to bring to mind by description; to symbolize, serve as a sign or symbol of; serve as the type of embodiment of" (Oxford English Dictionary, 1989). On the other hand, the word 'imagery', which is derived from several Latin terms, including *imago* ("a likeness"), *im-itari* ("to imitate"), *imaginer* ("to imagine, think"), and *imaginatus* ("to picture one's self") (Skeat, 1943: 282), is defined as the use of vivid or figurative language to represent objects, actions, or ideas (The American Heritage Dictionary, Fourth Edition, 2000). Richardson (1969) provides a frequently cited definition of mental imagery:

> "It refers to "all those quasi-sensory or quasi-perceptual experiences of which we are self-consciously aware, and which exist for us in the absence of those stimulus conditions that are known to produce their genuine sensory or perceptual counterparts, and which may be

[25] The importance of having well-developed aural skills in improvisation, which includes the practice of audiation, will be further discussed towards the beginning of Section 2.1.2.

> expected to have different consequences from their sensory or perceptual counterparts." (Richardson, 1969: 2-3).

According to Sternberg (2008), the term 'mental representation' may be construed as a broader conception of 'mental imagery', although the two terms are often considered to be synonymous (Paivio, 1985). Research on mental representation has been studied across several fields including cognitive psychology (Sackett, 1934; Lang, 1979; Ahsen, 1984), physiology (Carpenter, 1874), sports psychology (Munroe et al., 2000), and education, performance, and practice in the arts, which include dance (Nordin and Cumming, 2005) and music (Rubin-Rabson, 1941; Bowes, 2009).

Within the fields of music education and music performance, a significant part of the literature includes the uses of mental representations by means of 'mental practice' to aid music learning, memorisation, and alleviating performance anxiety. The studies in this research area comprises investigations into the multi-sensory nature of imagery usage, such as training oneself to hear a piece of music mentally through 'audiation' (Gordon, 2003a), maintaining the image of the music score during imaginary practice away from an instrument (Rubin-Rabson, 1941), and visualization techniques for envisioning a successful stage performance (Kirchner, 2003). In jazz improvisation, the presence of these mental images appears at the forefront of improvisers' experiences.

> "Amid the interplay of a performer's shifting modes of thought, different mental images sometimes occur simultaneously to reinforce the same musical pattern; other times, one kind of image predominates, favoring ideas peculiar to its own world of representation and imagination, and temporarily altering the nature of the solo. As different modes of thought wield varying degrees of influence within their separate or overlapping spheres of activity and periodically prevail over one another, their ever-changing balance constantly affects an improvisation's progressive musical events. The balance is, in turn, constantly affected by them. Ultimately, the dynamic interplay among different modes of musical thinking forms the heart of improvisation as a compositional process." (Berliner, 1994: 207).

These qualitative aspects of musical imagery that have been described by Berliner have also been investigated in behavioural, neuroimaging, and music psychology studies (Halpern, 2012; Keller, 2012; Bailes et al., 2012; Clark and Williamon, 2011). The latter, in particular, examined the qualitative variables of musical imagery, which included the vividness and strength of loudness, pitch, timbre, and tempo. Furthermore, the notion of musical imagery belongs to a more broader research area of 'auditory imagery' (Smith et al., 1992; Godøy and

Jørgensen, 2001) that investigates how inner speech occurs in cognition tasks such as silent reading, speech perception, and rehearsal of verbal memory (Brodsky et al., 2003).

In the field of music education, the concept of 'audiation' is similar to the notion of inner speech from cognitive psychology. Audiation describes the ability to hear and comprehend music silently without the physical presence of actual sounds (Gordon, 1980, 1997). As a particular case of musical imagery, audiation requires a deeper comprehension of music and was regarded by music education scholar Gordon (1997) to be fundamental to the development of sight-reading, composing, and improvising in his Theory of Music Learning (Shehan, 1986).

In his theory, Gordon (2003a) advocates audiation-based improvisation as part of an approach to music literacy, and defines improvisation as "the spontaneous audiation and use of tonal patterns and rhythm patterns with restrictions" (p. 122). According to Gordon (2007), there are eight types of audiation, where each audiation type takes place through a process involving six stages: (1) retention, (2) imitation, (3) recognition, (4) recollection, (5) association, and (6) anticipation. In particular, Gordon notes that music memorisation and recognition are only a part of the audiation process. Furthermore, Gordon emphasises on the importance of an external sound stimulus in order to start the process of audiation, and considers the presence of 'visual impressions' to influence some of the stages.

The concept of 'mental representations' or 'mental images' has also been closely linked with the construction of meanings in music making. Kalakoski (2001) asserts that "images are inherently meaningful" (p. 43), as both meanings and mental images are derived from perceived experiences. As Cohen and Inbar (2001) explain, "musical imagery comprises the different kinds of experiences and emotions embedded in musical schemata" (p. 137). Furthermore, Johnson (1987) regards 'meanings' as our way to make sense of and understand our experiences, and that this understanding "involves image schemata and their metaphorical projections" (p. 174). Moreover, such image schemata function as 'embodied structures' in our understanding.

> "[Image schemata gives a] general form to our understanding in terms of structures such as CONTAINER, PATH, CYCLE, LINK, BALANCE, etc. This is the level that defines form itself, and allows us to make sense of the relations among diverse experiences." (Johnson, 1987: 208).

Furthermore, Marc Leman has explored the notion of mental representations as embodied structures of meaning making in the construction of musical understanding. According to Leman (2010), the role of 'mental representations' in the musical meaning formation process has been largely investigated through the domains of music perception within music cognition. As such, research in this area has focused mainly on how mental representations act as 'carriers of structures' that affect emotions and corporeal feelings. The investigations undertaken by such studies involved having "human subjects assign a rating to tension and relaxation of tones within a tonal context" (Leman, 2010: 44). Furthermore, Leman suggests that mental representations are analogous to the concepts of memory and knowledge (*ibid.*, p. 44). 'Mental representations', then, may be understood as knowledge structures involving "regulatory mechanisms that determine meaning" (*ibid*.).

However, Leman argues that the role of 'mental representations' in musical meaning formation needs to be reconsidered with regards to different social contexts, how expression is shared, and body movement. As such, Leman proposes that a more nuanced view of this role is necessary in order to represent the "different ways in which humans make sense of music" (*ibid*., p. 47). According to Leman, an embodied semantic universe is "rooted in a dynamics [sic] of the human body and in activities that involve social communication" (*ibid*., p. 46). In other words, the notion of 'mental representations' playing a key role in the formation of musical meaning should also involve the human body as a mediator of experiences[26].

In order to provide a "methodology…that would focus exclusively on representations [in] meaning formation" (*ibid*., p. 59-60), Leman has developed a framework known as an *Embodied Approach to Musical Semantics*[27]. In particular, this framework is based on six types of semantics that "calibrate" mental representations (*ibid*., p. 52), which are shown in the following box with Leman's definitions.

[26] In this regard, Finney (1987) also notes: "sound made by the body is invested with meaning" (p. 46).
[27] As Leman (2010) explains, the *Embodied Approach to Musical Semantics* is "a framework for musical semantics, based on the concept of music embodied cognition" (p. 43).

Box 2.1: Key aspects of Leman's (2010) embodied approach to music semantics

Representational semantics: A grammar for note, chord, and key relationships. This grammar can be conceived as a conceptual description of mental representations that contain geometrical structures of note, chord and key relationships (p. 49).

Referential semantics: [S]onic patterns that function as pointers to meaningful contents. This is best understood by making a distinction between extra-musical and intra-musical meanings…Extra-musical meaning in music can be defined as meanings outside music…[such as] expressions of rural landscapes (*e.g. as in Dvorak Symphony no. 9 "From the new world")*...Intra-musical meaning in music [is] a kind of association between several structural components…[such as] a particular melodic or rhythmic theme that is repeated and slightly varied at different moments during a piece…[or] references to other musical pieces, such as in Berio's Sinfonia, in which fragments from Wagner' [sic] music are cited (p. 50).

Causal semantics: [T]he imagination (perhaps the representation) of the sound-source, and this will be based on the action-oriented ontology of the subject (p. 52).

Corporeal semantics: Meanings that are generated through the mediating activity of the human body. Musical stimuli are thereby perceived and become significant through body movements, rather than through mental constructions and imagination…[These meanings] are multimodal because it combines audio, movement, and other modalities (visual, haptic) (p. 53-54).

Collaborative semantics: [M]eanings that emerge from musical practices in a social context…[I]t can be characterized as an expansion of the corporeal semantics domain in the social domain. It is multimodal, because it involves audio, visual fields, movement, and other modalities (p. 54-55).

In particular, Leman's framework emphasises on "a multitude of approaches…in order to fully capture the different aspects involved in meaning formation" (Leman, 2010: 48). As such, Leman proposes several methods for implementing his framework.

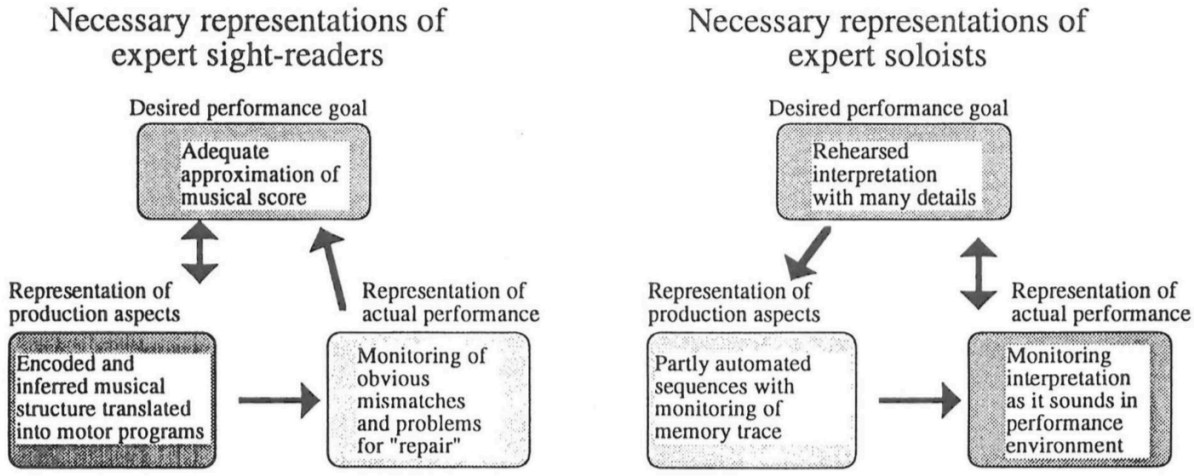
> "In representational semantics, the perspective is that of a third-person reflecting on the (computational or causal) mechanism that transforms patterns into indices of experience. In referential semantics, the perspective is that of a first-person describing her subjective musical experience. The second-person perspective introduces another dimension, namely the social interactive and communicative dimension, which in an empirical approach, is again handled from a multimodal viewpoint that fully complies with the distinction between experience and physical environment. It could be further stressed that the second-person perspective implies that corporeal expressions have aspects related to intentionality, collaboration, sharing and so on." (Leman, 2010: 59).

Thus, in addition to establishing 'mental representations' as part of the meaning formation process, the perspectives of the participant (e.g. first-person), the interviewer (e.g. third-person), and the interactions between them (e.g. second-person) in Leman's framework offer

access points for understanding professional improvisers' mental representations. However, in order to apply Leman's framework to the context of music improvisation, the next subsection turns to introduce Lehmann's (1997) model of *Necessary Tripartite Mental Representations* in expert musical performance.

2.1.3 Theory of 'acquired mental representations'

In his work titled *Acquired Mental Representations in Musical Performance* (1997), Andreas C. Lehmann proposed that different "types of mental representations…are involved in preparing and executing a given performance" (Lehmann, 1997: 141). Having investigated the memorisation and sight-reading skills of sixteen university piano students[28], Lehmann proposed a model that shows how expert musicians in two different performance contexts might assume three 'necessary' mental representations: (1) mental representation of the desired performance goal, (2) mental representation of the production aspects, and (3) mental representation of the actual performance (Lehmann, 1997: 142). In particular, Lehmann provides a diagram (presented below) illustrating how the mental representations of an expert soloist might differ from those of an expert sight-reader[29].



[28] Lehmann's (1997) study comprised two experiments. In the first experiment, the pianists were asked to perform four trials of sight-reading for two pieces of new music, where they were measured based on the accuracy of their performances. Afterwards, the pianists participated in several tasks, one of which involved improvising on an unfamiliar piece of music. In the second experiment, the pianists were asked to learn two short pieces of music, and then were monitored on the number of repetitions required to fully memorise the new piece. The findings in Lehmann's study "demonstrate the existence and importance of mental representations for mediating adaptive performances" (Lehmann, 1997: 152).

[29] According to Lehmann (1997), the general purposes that these three mental representations serve in a musical performance remain the same. The specific functions for each mental representation, however, can vary depending on the constraints and demands required from particular musical performance tasks (*ibid.*, p. 143).

Figure 2.1: Lehmann's (1997) tripartite mental representations (p. 142)

Lehmann's diagram above illustrates the different ways these three mental representations may function in two music performance contexts. The set of three mental representations on the left illustrates how an expert sight-reader might be engaged while performing a relatively new piece of music. On the right, the set of three mental representations illustrates how an expert soloist might be engaged while performing a piece of fully memorised music that has been learned and rehearsed for over a period of time. Thus, Lehmann suggests that, "the type of mental representation that is most suitable under one performance condition may not be as useful in another" (Lehmann, 1997: 153).

In the case of the expert sight-reader, the goal is to deliver an 'approximation' of the music. In the sight-reader's mental representation of the production aspects, appropriate strategies are adopted as the performance unfolds, and will change constantly due to unpredictable circumstances. As such, the task demands of expert sight-readers often involve a significant amount of improvisation. For most of the performance, the sight-reader is focused on making sure that his/her adopted strategies are sufficient for delivering an 'adequate' approximation, which is shown by the double-headed arrows indicating a reciprocal interaction between these two mental representations. In addition, the expert sight-reader monitors the his/her mental representation of the actual performance in order to fix any 'obvious mismatches' (*ibid*.) from the goal-based mental representation.

On the other hand, the goal of the expert soloist is to accurately reproduce the original music (e.g. from a music score). As such, the adopted strategies, such as particular motor actions, have become 'automated' in the soloist's mental representation of the production aspects. During most of the performance, the soloist is focused on making sure that his/her mental representation of the actual performance matches the goal-based mental representation, which is shown by the double-headed arrows indicating a reciprocal interaction between these two mental representations. The soloist also monitors the automated sequences of his/her strategies, such as during a brief memory lapse (*ibid.*, p. 142-143).

Furthermore, Lehmann suggests that the notion of these three mental representations may be used to observe the unique skills acquired by each musician. Although their exact nature remains to be understood, Lehmann proposes that as a concept, these three mental

representations can create an "observable skill structure" (*ibid.*, p. 158) that offers a way to study the acquired skills and the unique training of expert musicians, including improvisers. The next section, then, uses Lehmann's model as a lens to critically examine the role of goal-based mental representations in the music improvisation process at the professional level. In particular, two different cognitive models of improvisation by Clarke (1988) and Pressing (1988) are discussed in the context of Lehmann's model[30].

2.2 Mental representation of the desired performance goal

This section adopts Lehmann's (1997) model[31] and Leman's (2010)[32] framework as a lens to conceptualise the notion of goal-based mental representations, which is characterised as music culturally-informed goals that are driven by improvisers' intentions and/or decisions. Drawing from the perspective of music psychology, an emerging key point is that improvisers' mental representations of the desired performance goal may exist at two levels: (1) a *global level* that focuses on the overall structure and style of the improvisation, and (2) a *local level* that focuses on smaller goals during the improvisation, such as deciding on the musical direction for the next few phrases. In the following three subsections, two cognitive models by Eric Clarke (1988) and Jeff Pressing (1988) that centrally feature the concept of 'mental representations' in the musical improvisation process are introduced and expounded to highlight the goal-based characteristics of both models.

2.2.1 Global-level goals

In his work titled *Generative Principles in Music Performance* (1988), Eric Clarke introduces an improvisation model that feature "representational structure[s] of musical knowledge" (Clarke, 1988: 10). In particular, Clarke's model proposes that various 'representational structures' underlie different improvisation practices[33]. The representational structure of a traditional jazz improvisation, for example, might involve a "more or less clear idea of the overall shape of the piece" (*ibid.,* p. 6). In this regard, representational structures may be understood as global-level goals or 'long-term anticipation', which involves the "[p]rojection

[30] In Section 2.2.3, Leman's (2010) framework (see Section 2.1.2) will be also used as another lens for accessing the musical and cultural influences on improvisers' goal-based mental representations.
[31] See Section 2.1.3.
[32] See Section 2.1.2.
[33] For example, the representational structure of free jazz would involve "no preconceived ideas…[except for] a motivic germ for a piece" (Clarke, 1988: 6)

of long-term plans" for an improvisation (Kenny and Gellrich, 2002: 124).

In addition, Clarke proposes that representational structures comprise the organisation of "low-level musical units", which are characterised as "small-scale, organised event[s]" (*ibid.,* p. 8). In particular, these musical units can be arranged into three representational structures that feature different jazz improvisation styles. The original diagrams from Clarke's model are presented below along with his explanations.

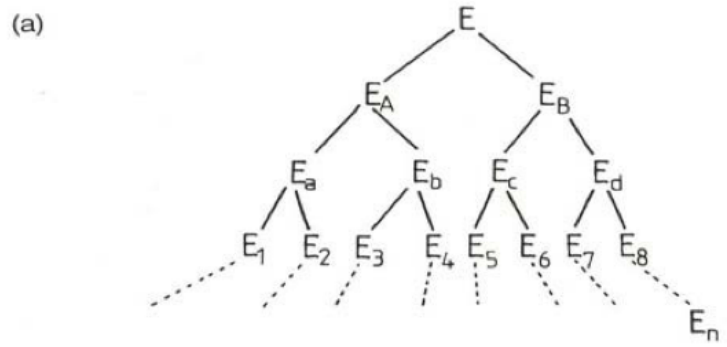


Figure 2.2: Hierarchically structured improvisations (Clarke, 1988: 8)

"(1) The first event may be a part of a hierarchical structure, to some extent worked out in advance, and to some extent constructed in the course of the improvisation." (Clarke, 1988: 8)

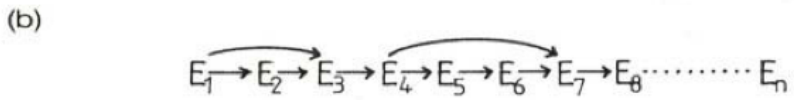


Figure 2.3: Associatively structured improvisations (Clarke, 1988: 8)

"(2) The first event may be part of an associative chain of events, each new event derived from the previous sequence by the forward transfer of information." (Clarke, 1988: 8).

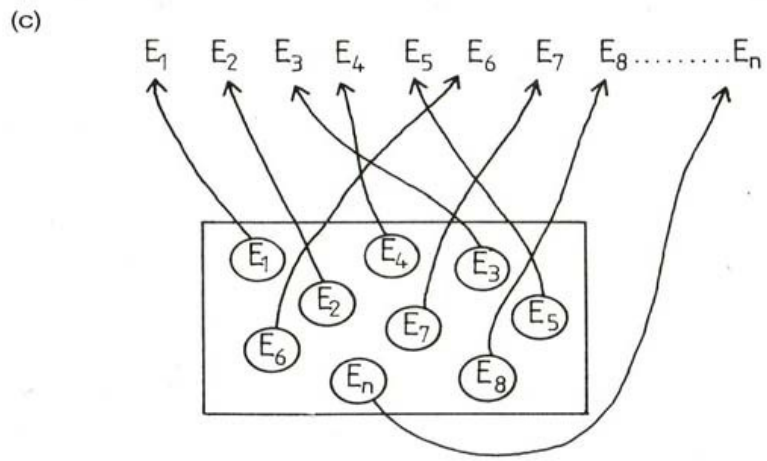


Figure 2.4: Improvisations structured by repertoire selection (Clarke, 1988: 8)

> "(3) The first event may be selected from a number of events contained within the performer's repertoire, the rest of the improvisation consisting of further selections from this same repertoire, with a varying degree of relatedness between selections." (Clarke, 1988: 8).

As Clarke's diagrams show, these basic musical units may be organised in three different ways: (a) hierarchically; (b) associatively; and (c) by repertoire selection (*ibid.,* p. 9). Each of the representational structures in the three diagrams may also be understood as distinctive global goals that are realised differently. In particular, the entire visual structure of each diagram portrays the "overall shape of the piece" (*ibid.,* p. 6), such as a tree diagram, a linear sequence, or a cluster of units. Meanwhile, the arrows in each diagram indicate how the "shape will be realized" (*ibid.,* p. 6).

As improvised performances "are never entirely associative, or perfectly hierarchical" (*ibid.,* p. 9), all three types of representational structures can take place within "an overall framework (associative or hierarchical) of some sort, however vague" (*ibid.*, p. 10). This suggests that one or more of these representational structures (e.g. such as 'repertoire selection') can be incorporated into a larger representational structure (e.g. hierarchical). In other words, an improviser's global goals may comprise local goals that focus on smaller musical events in an improvisation.

Clarke's model, however, has raised several questions. First, what constitutes a "low-level musical unit" (*ibid.,* p. 8) – for instance, would it comprise a melodic or a rhythmic motif, or a

longer theme?[34] Second, what are the properties or features that can help to identify the boundaries of this "small-scale, hierarchically organised event" (*ibid.*)? Lastly, what considerations are given to the external conditions that might influence the "very earliest stages" (*ibid.*) of an improvisation? For instance, if an improviser was given a musical stimulus to improvise on, what is the relationship between his/her understanding of the stimulus, and the "low-level musical unit" that is later employed? To better understand how these other factors may influence the formation of these representational structures, the next subsection continues to build on the conceptualisation of a goal-based mental representation at the local-level, in particular focusing on Jeff Pressing's (1988) improvisation model.

2.2.2 Local-level goals

Jeff Pressing's work, titled *Improvisation: Methods and Models* (1988) provides a cognitive model that describes the musical improvisation process[35] as a sequence of musical events[36]. A set of mental representations, known as 'aspects' (*ibid.*, p. 154), are involved in the generation of each musical event. These aspects, which exist in two forms (e.g. intended and actual), are an improviser's mental representations of each musical event from different perspectives: (1) the *acoustic aspect* – the representation of the aural properties of the sound (e.g. pitch and timbre); (2) the *musical aspect* – the cognitive representation of these sounds and its expressive dimensions (e.g. a minor chord); (3) the *movement aspect* – the representation of physical actions and their timings (e.g. fingerings for an arpeggio), (4) the *visual aspect*, and (5) the *emotional aspect* (*ibid.*)[37]. In particular, the intended forms of these 'aspects' function as local goal-based mental representations, while their actual forms function as mental representations of the actual performance[38], which are used as feedback to construct the intended aspects for future events.

In addition, each of these aspects are decomposed into 'analytical representations' that "represent all information about *Ei* needed by the improviser in decision making" (*ibid.,* p. 154). Like aspects, these analytical representations also exist in intended and actual forms.

[34] Norgaard (2008) has also pointed out the same issue on p. 25.
[35] Although Pressing's (1988) model describes the process of a solo improvisation, Pressing notes that the model may also be applied to the context of a group improvisation (see p. 153-154).
[36] Although Pressing does not specify the length of each musical event, the examples he provided include three and four-note motifs (Pressing, 1988: 156, 162-164; Norgaard, 2008: 25)
[37] The visual and emotional aspects, however, have not been defined and appear to be marginalized in Pressing's model.
[38] The improvisers' mental representations of the actual performance will be discussed in Section 2.4.

There are three types of analytical representations: objects, features, and processes, which respectively correspond to how improvisers perceive (1) each aspect as a unified entity (e.g. a chord/finger motion), (2) the relationships between different aspects (e.g. shared properties between several chords/finger motions), and (3) the changes that these relationships undergo (e.g. changes in the chord progression/finger motions). Furthermore, these three types of analytical representations can be understood as information that has been gradually acquired into an improviser's knowledge base[39], which includes "all the music the improviser has learned previously" (Norgaard, 2008: 22). This interpretation might help to explain why "a limited number of new objects" and "at most very few new features or processes will be created" during an improvisation (Pressing, 1988: 161).

To illustrate his model, Pressing provides a diagram (shown below) that maps out the key components that are involved in using feedback from a current musical event to generate a future musical event. First, it shows how each aspect (e.g. acoustic, musical, movement, et al.) of a current musical event (*Ei*) is decomposed into three types of analytical representations (e.g. object, features, and processes).

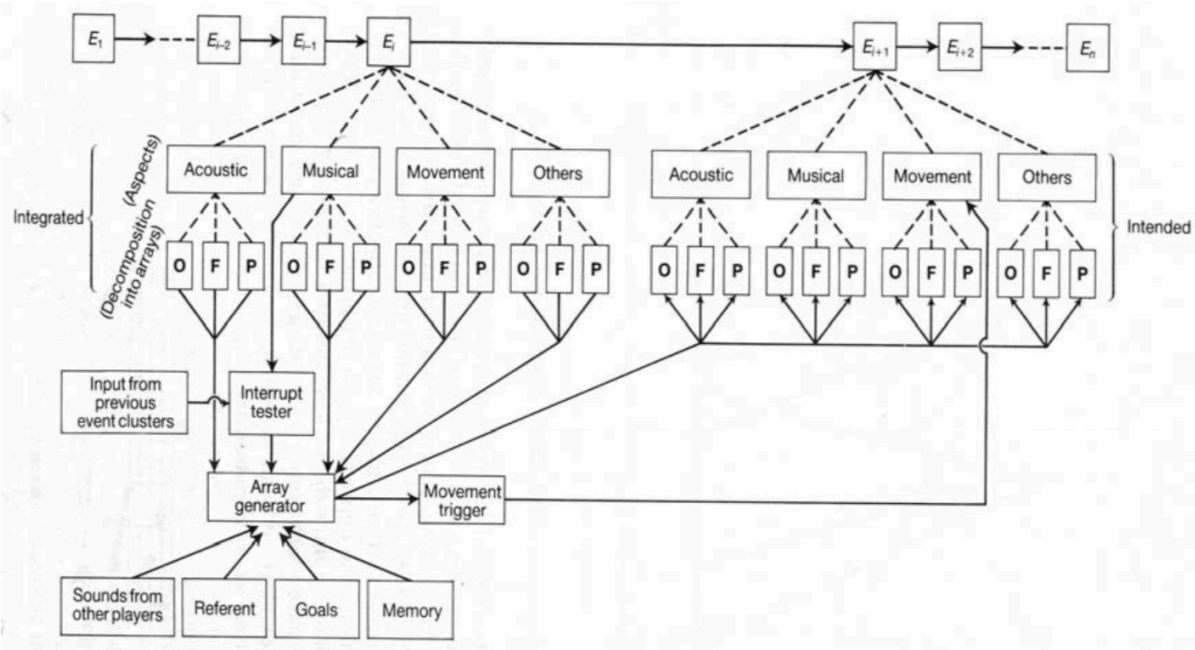


Figure 2.5: Pressing's (1988) improvisation model (p. 160)

[39] Recalling back to Section 2.1.2, Leman (2010) has also conceptualised 'mental representations' as forms of knowledge.

To generate a future musical event (*Ei+1*), an improviser uses feedback from the current musical aspect and previous events to decide whether to continue or go into a different musical direction. Following the decision of this local-level goal, which takes place inside the 'interrupt tester', the improviser then constructs a set of intended aspects and analytical representations for the new musical event (*Ei+1*). The generation of these intended mental representations takes place in the 'array generator', where the improviser uses feedback[40] from the other aspects of the current event, as well as input from his/her memory, the main goals for the performance, the referent (e.g. musical stimulus), and sounds from other players. These intended mental representations or local goals act as a set of constraints for the production of the new musical event, which is initiated by a 'movement trigger'. From Pressing's model, then, three goal-based characteristics are identified: (1) the intended forms of the aspects and analytical representations act as goal constraints for future musical events, (2) the interrupt tester that decides on what musical direction to take, and (3) the main goals that inform the array generator. The first two types are local-level goals that resonate with the notions of 'short-term' and 'medium-term' anticipation, which describes how musical events that occur within one to twelve seconds are anticipated and projected into the future (Kenny and Gellrich, 2002: 124). However, the function of the third type is unknown, although its position in the diagram indicates a global-level influence.

While Pressing does offer, among others, detailed examples of analytical representations for a musical aspect[41], in-depth considerations of other influences on the array generator, such as the musical stimulus and the improviser's memory, were not included. Indeed, Clarke (2005) has pointed out that Pressing's theory is "actually not formal enough to implement as a testable model" (p. 170). How then, can a researcher study these other factors that influence an improviser's goal-based mental representation? In the following subsection, I propose that Leman's (2010) framework[42] may be a useful lens for accessing cultural and other subtle influences on improvisers' mental representations.

[40] The consideration of improvisers' perceptions of performance feedback, or mental representations of the actual performance, will be presented in Section 2.4.
[41] See the trombone motive on p. 154 (Pressing, 1988).
[42] See Section 2.1.2.

2.2.3 Grammatical meanings

Earlier in Section 2.2.2, the three types of 'analytical representations' (e.g. objects, features, processes) in Pressing's (1988) model were presented as information that has been acquired into an improviser's knowledge base[43], which is then used for generating new aspects (e.g. acoustic, musical, movement) for the next musical event. For instance, the analytical representations for a musical aspect would comprise: the knowledge of a chord (object), the knowledge of its relationship to other chords (feature), and the knowledge of how chords change in a harmonic progression (process). In this regard, these analytical representations appear to draw a strong parallel to Leman's (2010) concept of 'representational semantics', where "a grammar for note, chord, and key relationships…[is] conceived as a conceptual description of mental representations that contain [musical structures]" (Leman, 2010: 49).

This common point between Pressing's (1988) model and Leman's (2010) framework can be used to understand how improvisers' goal-based mental representation are influenced by different meanings from various musical cultures and genres. Using classical Indian and jazz improvisation practices as examples, the concept of a 'melody' can have grammatically different meanings in these two genres. The goal of a jazz improviser, for instance, would often involve adopting a harmonic-based approach in his/her improvisation.

> "For the jazz musician, a song is regarded as a sequence of chords with an originally written melody that's only performed the first time through; the same chord progression is then cyclically repeated as improvised melodies are substituted for the original one. When jazz players improvise, they play on the changes (chords), generating melodies laid over their underlying progression." (Sudnow, 2001: 6).

In the example above, a jazz improviser's knowledge base comprises a musical vocabulary of various chord progressions, and the harmonic grammar for generating melodies that correspond with specific chord progressions. On the other hand, Viram Jasani, an improviser from the classical Indian music tradition, describes an improvisation goal involving a melodic-based approach.

> "When we start a performance of the raga we start very slowly. We play what is called alapa. And the purpose of alapa is to explore the melodic possibilities within that raga, which has nothing to do with rhythm or style. And the first thing we do is to establish the keynote... This can be done with a drone or just by playing a phrase up the keynote […]

[43] See also Leman's (2010) conceptualisation of 'mental representations' as memory and knowledge structures in Section 2.1.2.

> And you pick out each note in this scale as you go up the scale and your phrases are created and improvised around each particular note." (Bailey, 1992, p. 6).

As Viram explains, the *raga* Section of a classical Indian improvisation requires a knowledge base comprising a musical vocabulary of scale patterns in various keynotes, and the grammar for how to develop each note in a scale. Although melodic elements are featured in both jazz and classical Indian improvisation practices, the latter adopts an improvising framework that is driven by a note-based approach.

If an improviser's goal-based mental representation can be understood as a knowledge base consisting of a specific musical grammar, then a musical event in Pressing's model might also be understood as a "representation of structures in music" in Leman's framework (Leman, 2010: 49). Recalling back to Section 2.2.1, Clarke's (1988) notion of a "small-scale, hierarchically organised event" (p. 8) also resonates strongly with this common aspect in Pressing's model and Leman's framework. Although these common aspects have been identified, the influences that shape the length and nature of these musical events remain unresolved.

To bring this discussion to a close, then, this section has adopted Lehmann's (1997) model[44] and Leman's (2010) framework[45] as conceptual lens to introduce and critically discuss the two improvisation models by Clarke (1988) and Pressing (1988). In particular, both models feature goal-based mental representations that are driven by improvisers' intentions and/or decisions. Clarke's model features 'representational structures' that underlie various improvisation practices, which illustrate the global-level plans of different improvisation styles. Meanwhile, Pressing's model describes how improvisers make local musical decisions that inform the generation of intended 'aspects' and 'analytical representations', which become future goal constraints. Finally, Leman's (2010) concept of 'representational semantics' was used to examine different culturally-informed musical grammars and their influences on improvisers' goals. The next section, then, considers how these goals are realised during an improvisation.

[44] See Section 2.1.3.
[45] See Section 2.1.2.

2.3 Mental representation of the production aspects

This section continues to draw from Lehmann's (1997) model and Leman's (2010) framework to conceptualise the notion of production-based mental representations, which is characterised as improvisers' multimodal strategies to realise their goal-based mental representations. Drawing from the perspectives of music phenomenology and music psychology, an emerging key point is that improvisers' mental representations of the production aspects involve: (1) a distillation of local-level goals into musical, physical, and expressive components, and (2) the multimodal strategies and skills to develop and implement these goals. In the following three subsections, the music phenomenological work of Alfred Pike (1974) is introduced and expounded to illuminate the production-based characteristics of Pressing's (1988) and Clarke's (1988) improvisation models.

2.3.1 Distillation of local-level goals

Recalling back to Section 2.2.2, it was pointed out that certain influences on the array generator, such as the improviser's memory and the musical stimulus, are somewhat marginalised in Pressing's (1988) improvisation model[46]. Furthermore, the significant role of the array generator, which involves the development and implementation of local-level goals, draws a strong parallel to production-based mental representations. To understand these types of influences, it is necessary to adopt a phenomenological perspective like that of Pike (1974) in order to access improvisers' lived experiences. A professional jazz improviser himself, Alfred Pike had developed a method called, *A Phenomenology of Jazz* (1974) to study "the basic forms of jazz experience" (p. 88) in "controlled improvisation, on given music material, [which] is more common" (p. 93). Consistent with the characteristics of production-based mental representations, Pike's method describes a process where improvisers create 'tonal images' by drawing from their memories, the given musical material, stylistic requirements, and sounds from other players.

According to Pike (1974), improvisers create music using 'tonal imagery', which is "a dynamic process of inner hearing" that is "closely related to…the perception of internal movement" (*ibid.*, p. 88). During an improvisation, these tonal images are projected into perceivable 'tonal events' that include "single tones, intervals, motives, themes, chords, chord

[46] See Section 2.2.2.

progressions, [and] rhythmic patterns" (*ibid.*). In addition, tonal imagery consists of two types. The first type, reproductive imagery, are reinstated images derived from previous musical experiences. In contrast, productive imagery are creative images that combine "previously acquired data into new imaginal unities" (*ibid.*). Lastly, the creation and perception of these internal tonal images, external tonal events, and "the states of consciousness aroused by these images" take place within an improviser's 'perceptual field' (*ibid.*, p. 89). In this regard, Pike's concepts of 'tonal imagery' and 'tonal event' resonate strongly with improvisers' 'intended' and 'actual' representations of musical events in Pressing's model. Furthermore, Pike's concept of 'productive images' is similar to the notion of production-based mental representations, while the process of its creation is comparable to the array generator, where intended aspects (e.g. goals) are generated from improvisers' memories.

In addition, the lived experiences of jazz improvisers can help bring a better understanding of the perceptual field in Pike's work. Berliner's (1994) ethnographic description in the following captures the experiential aspects of jazz improvisers' perceptual fields.

> "From the outset of each performance, improvisers enter an artificial world of time in which reactions to the unfolding events of their tales must be immediate. Furthermore, the consequences of their actions are irreversible. Amid the dynamic display of imagined fleeting images and impulses – entrancing sounds and vibrant feelings, dancing shapes and kinetic gestures, theoretical symbols and perceptive commentaries – improvisers extend the logic of previous phrases, as ever-emerging figures on the periphery of their vision encroach upon and supplant those in performance." (Berliner, 1994: 220)

In particular, Pike's (1974) "conception of a tonal image…in the improviser's *perceptual field*" (p. 89) resembles Berliner's account of improvisers' "artificial world of time" during which "ever emerging figures" appear in the improvisers' "periphery of vision". Furthermore, Berliner's references to jazz improvisers' "imagined fleeting images" in the form of "entrancing sounds and vibrant feelings, dancing shapes and kinetic gestures" also correspond with the different types of aspects (e.g. acoustic, musical, movement, emotional, and vision) in Pressing's model.

According to Pike, the conception of a productive image occurs in two steps: 1) intuitive cognition, and 2) prevision[47]. Intuitive cognition, in particular, "consists of an immediate, localized understanding, a perceptive penetration into the singular and expressive nature of an

[47] The process of 'prevision' will be discussed further in Section 2.3.2.

image" (*ibid.*, p. 89-90). For instance, the "objective essence" of a productive tonal image (e.g. a musical motive) consists of "its individual pitch relationships, rhythmic content, its overall shape and registral placement, and its affective value – all of which differentiate it from other motives" (Pike, 1967: 317). Furthermore, each of these elements corresponds to a type of aspect in Pressing's model. In particular, the individual pitch relationships and rhythmic content may be regarded as a musical aspect; the registral placement as a movement aspect; the overall shape of the motive as a visual aspect; and the motive's affective value as an emotional aspect[48]. The process of intuitive cognition, then, explains how the array generator in Pressing' model distils the musical decisions made by the interrupt tester[49] into musical, physical, and expressive components, which are then generated into intended aspects (and their analytical representations) to act as a set of constraints for the new musical event[50].

What remains less clear is how the contents of a tonal image (e.g. a specific musical motive) are initially chosen. It may well be that initial materials are derived from a given musical stimulus. As Pike (1974) has pointed out, in the context of a thematic musical improvisation, "[w]hat is first given must be developed" (p. 89). Along with Pressing (1988), Pike also acknowledged that the conception of tonal images "involv[e]…some form of memory" and "take shape according to certain stylistic requirements" (*ibid.*), including "what the other musicians are playing" (*ibid.*, p. 88). On the other hand, the importance of feedback in both Pike's and Pressing's work suggests that improvisers' choices of materials for the next musical event are inevitably linked to how the current musical event was implemented. The following subsection, then, considers how improvisers use production-based mental representations to develop and implement local-level goals.

2.3.2 Development and implementation of local-level goals

Following the process of intuitive cognition[51] (Pike, 1974), where improvisers distil larger musical decisions into smaller concrete goals, the next step of developing and implementing

[48] In this case, the acoustic aspect (e.g. produced and sensed sound) would not be present as the tonal image is still in its conception and has not yet been projected into a tonal event.
[49] Recalling back to Section 2.2.2, the interrupt tester makes goal-based decisions, such as the musical direction for the next musical event. See Figure 2.5., which shows the interrupt tester in Pressing's (1988) diagram of his model.
[50] It is proposed that the generation and development of intended aspects and analytical representations (e.g. the development and implementation of ideas) takes place during the process of prevision, which is discussed in Section 2.3.2.
[51] See Section 2.3.1.

these goals or productive tonal images is known as 'prevision'. During prevision, improvisers "instantaneously gras[p]…[the] developmental possibilities…of the embryonic jazz idea…[which] can be repeated, or permuted in various ways" (*ibid.*, p. 89-90). This definition also suggests that the process of prevision involves the strategic planning and execution of skills and novel behaviour, such as varying the intervallic and rhythmic structures of a motive.

In this regard, the construction of intended aspects and analytical representations[52] within the array generator in Pressing's (1988) improvisation model involves similar considerations. For instance, an improviser might use a three-note piano motive (e.g. object) to construct an intended musical aspect that transposes the original notes and their intervals into a different key (e.g. features) and changes the original rhythm (e.g. processes). Meanwhile, the intended movement aspect might retain the original fingerings for the transposed motive (e.g. object) and then apply them to a higher register on the piano (e.g. features), along with a different timing of muscular actions for the new rhythms (e.g. processes)[53]. Thus, through prevision, the process of developing ideas involves the strategies of associating, combining, and organising the distilled musical, physical, and emotional components of musical decisions into a set of constraints.

On a larger scale, improvisers also develop a tonal image by "see[king] for relationships" with "other images in the accumulation of phrases as well as relations among its own particular structural components" (Pike, 1974: 90). In this way, a musical continuity is established during improvisation, where "[a]s subsequent ideas are produced, a synthetic unity is built from a multiplicity of appearances" (*ibid.*). This higher-level approach for developing ideas is similar to the generative principles (e.g. hierarchical, associative, and repertoire selection) in Clarke's (1988) improvisation model[54]. In particular, these generative principles describe how musical events can be organised differently during an improvisation, and how subsequent events relate to the first event (e.g. an initial musical idea). Furthermore, each generative principle reflects, among others, a particular jazz improvisation style.

> "The improvising style known as free jazz is principally characterized by associative structure, since it eschews the constraints of a pre-planned structure, and attempts to avoid the use of recognizable 'riffs'. More traditional jazz improvisation tends towards the hierarchical principle, in its adherence to a fairly strict harmonic outline. And be-bop

[52] See Section 2.2.2.
[53] For more detailed examples, see p. 162-164 in Pressing (1988).
[54] See Section 2.2.1.

> improvisation illustrates the selective principle in the way in which a performer may try to construct an improvisation so as to include as many 'quotes' from other sources as possible (ranging from other jazz pieces to national anthems)." (Clarke, 1998: 10).

At the same time, Clarke points out that, "different improvising idioms can be characterized by the balance of the three principles, and the interactions between them" (*ibid.*). Nevertheless, Clarke's model shows how synthetic unity in an improvisation is achieved by establishing particular relationships between musical events. Within the structure of repertoire selection in be-bop, for instance, the use of musical quotes unifies the musical events. Meanwhile, a harmonic outline unifies the musical events within the hierarchical structure of traditional jazz. In other words, these different improvisation styles show a higher-level approach of how improvisers "combin[e] scattered ideas into a unified, harmonious whole", including how "jazz images are…organised, combined, associated, and contrasted" (Pike, 1974: 90, 89). Furthermore, these examples suggest that in addition to the development of individual musical ideas, production-based mental representations are also involved in the establishment of relationships to other musical ideas.

Moreover, Pike suggests that an improviser's creative inspiration is affected by whether or not he/she is successful in establishing 'fruitful' relationships between tonal images. In particular, Pike distinguishes the relationships that involve productive images from those that involve reproductive images[55].

> "The jazz improviser seeks for relationships within an evolving musical continuity. If his search is fruitful the tonal images flow along freely without interruption. If some impeding factor arises, his inspiration may lag or lapse. At this point free productive imagery gives way to stereotyped, reproductive patterns, which are drawn from the fund of his previous jazz experience." (Pike, 1974: 90).

Recalling that productive imagery comprises a novel combination of acquired knowledge, this suggests that the relationships between productive images must reflect a similar kind of novelty. In addition, this implies that an improviser's search for novel yet relevant relationships to other images involves skill and effort. When the search for these particular relationships is interrupted, improvisers default back to reproductive imagery by reinstating pre-learned formulas that may share little relevancy to the previous image. Kenny and Gellrich (2002) likened this default strategy to the concept of 'repertoire selection' in Clarke's

[55] Pike's (1974) concepts of 'reproductive' and 'productive' tonal images are presented in Section 2.3.1.

model, referring to it as "a momentary resting point for improvising musicians (when inspiration fails)" (p. 122). Thus, improvisers are more likely to experience inspiration when their production-based mental representations include the necessary strategies and skills to implement, develop, and connect together new ideas in order to successfully realise goals. Furthermore, the experience of inspiration during improvisation is similar to the concept of 'flow' (Csíkszentmihályi, 1990), which describes an "optimal state of inner experience" that occurs when goals are achieved through "skills [that] match the opportunities for action" (p. 6). However, in order to understand how goals are implemented, it is necessary to consider what kinds of knowledge improvisers' strategies and skills involve, including the different types of meanings that improvisers construct during the implementation of ideas. It is to these considerations that the following subsection turns.

2.3.3 Multimodal meanings

Thus far, the previous two subsections have laid out the overlapping key concepts from Pike (1974), Pressing (1988), and Clarke (1988) that collectively describe how production-based mental representations realise goals through several processes. While these scholars have focused largely on the involvement of musical knowledge in the distillation and development of ideas, the implementation of ideas and other kinds of knowledge were under-discussed. Indeed, the involvement of physical knowledge, among others, were briefly covered by Pressing and Pike despite the significance it occupied in both works. Pressing's (1988) improvisation model, for instance, features two movement-based components: (1) an aspect representing the action and timing of movements, and (2) a 'movement trigger' that starts the process of implementing intended analytical representations (e.g. distilled goals) for a future musical event (p. 160). Similarly, the central concept of 'tonal imagery' in Pike's (1974) work is defined as "closely related to…the perception of internal movement" (p. 88). Pike makes clear, however, that improvisers are aware of their activities at every moment during an improvisation, which is corroborated by Sudnow's (2001) description of the specific strategies and skills he used.

> "In a chromatic pose, my hand could be aimed toward any sector in sufficiently prepared shape, precisions then to be toned up as the contact is made. As one finger in this chromatically poised hand makes contact, it finds where in the depth and width of a key it is, and the hand's chromaticality becomes correspondingly toned for the sector's dimensions running off in both directions from the point of appraised contact. In such a chromatic approach, the thumb stays back away from the black notes, so that a directed

> course can be taken regardless of where the starting point of a set-down happens to be." (Sudnow, 2001: 58)

Consistent with the process of prevision[56], that Sudnow's hand is readily positioned to execute chromatic passages suggests some strategic planning is involved. In this case, the developmental possibilities of a set of chromatic notes are generated into an *intended* movement aspect[57] in Pressing's model. By way of associating, combining, and organising distilled goal-based components, the corresponding *intended* analytical representations comprise: (1) the hand position for the chromatic scale (e.g. object); (2) the fingerings shared between possible chromatic passages (e.g. features); and (3) the possible changes in hand locations for playing the scale in both directions (e.g. processes). Within this set of movement-based constraints, a particular skill of playing chromatic passages (e.g. the thumb tucked away from black keys) is executed, while the hand adjusts to the changing terrains on the keyboard. Sudnow's experience suggests that a type of "thinking in motion" (Pace, 1999: 18)[58] is involved, where "the sounds have become an expressive gesture…the tones themselves have become hand, since they speak in gestures." (Ansdell, 1995: p. 211). In this regard, Sudnow's phenomenological description indicates the construction and implementation of 'corporeal semantics' (Leman, 2010), where meanings are formed through body movement. Thus, production-based mental representations comprise physical knowledge that is applied to movement-based strategies and motor skills for developing and implementing ideas during the process of prevision.

Furthermore, the different types of aspects in Pressing's model suggest that the development and implementation of musical ideas involve multimodal forms of knowledge. For instance, jazz improvisers among others have been known to apply visual-based strategies and skills to develop, implement, and monitor ideas, as well as learn new music.

> "At times, Emily Remler visualizes the music's beat as a regular sine wave in relation to which she varies the phrasing of her melodies. One saxophonist speaks of visualizing precise linear figures in staff notation the instant before performing them. Several pianists mention that, having learned versions of a piece's structure and distinct melodic routes through them as alternative configurations of black and white keys, they can subsequently envision the designs as a matrix of superimposed patterns on their keyboards – a

[56] See Section 2.3.2.
[57] See Section 2.2.2.
[58] Also known as 'gestural imagery' (Godøy and Jørgensen, 2004) and 'motor imagery' (Jeannerod, 1995; Berthoz, 1996).

> composite tablature-like image whose reading can suggest different pathways for invention." (Berliner, 1994: 175).

Moreover, these examples show how improvisers integrate visualisation techniques with physical and musical knowledge to monitor phrasing variations, guide execution of figures, learn patterns and structures, and invent similar pathways on the keyboard. In particular, the pianists' strategies illustrate both intuitive cognition[59] and prevision by envisioning "a matrix of superimposed [keyboard] patterns", which are then used to "suggest different pathways for invention". Meanwhile, the saxophonist provides another example of prevision where a figure is implemented according to a visualisation of its precise notation. In addition, these examples suggest that improvisers' visual knowledge include 'intra-musical meanings', a type of referential semantics in Leman's (2010) framework that involves associations between structural components such as melodic variation, pattern-matching, and similarity-matching (p. 50). Thus, production-based mental representations comprise the integration of visual, physical, and musical knowledge that involve the construction and implementation of referential (intra-musical), causal, and corporeal meanings.

To summarise, then, in this section production-based mental representations are conceptualised as a combination of multimodal knowledge structures and processes that are involved in realising goals. In particular, Lehmann's (1997) model was used to identify production-based characteristics in the theoretical work of Pike (1974), Pressing (1988), and Clarke (1988). Pike's concepts of 'intuitive cognition' and 'prevision' were identified as processes involved in the distillation, development, and implementation of ideas. These concepts also helped to illuminate how intended 'aspects' and 'analytical representations' are generated in Pressing's model, and how Clarke's three generative principles contribute to idea development during improvisation. Lastly, Leman's (2010) framework was used to illustrate the strategies and skills that improvisers use to implement ideas, which are accompanied by the construction of multimodal meanings. Taken together, these concepts highlight the complex roles production-based mental representations play in transforming goals into actual performances. The consideration of how the latter is used as performance feedback during improvisation is explored in the next section.

[59] See Section 2.3.1.

2.4 Mental representation of the actual performance

Having conceptualised goal-based mental representations[60] and production-based mental representations[61] thus far, this section turns to work conceptually with the notion of reflection-based mental representations, which comprises feedback information from improvisations. Characterised as improvisers' use of performance feedback to monitor their improvisations, a key point emerging from the literature is that improvisers' mental representations of the actual performance involve: (1) multimodal feedback information recalled from previous musical events, and (2) the reflection and incorporation of (metaphorically organised) feedback into future goals. The following three subsections, then, use Lehmann's (1997) model and Leman's (2010) framework to consider the feedback characteristics in Pressing's (1988) and Pike's (1974) work.

2.4.1 Feedback recollection

In Pressing's (1988) improvisation model, the different types of acoustic, musical, and movement aspects[62] that represent a current musical event (*Ei*) suggest that improvisers perceive aural and touch feedback (among others) during performance. These multimodal forms of feedback redundancy reinforce the intricate connections in an improviser's knowledge base, such as knowing how certain motor actions will correspond to particular sounds, thereby allowing "maximal flexibility of path selection" (*ibid.*, p. 159). Recalling back to Pressing's diagram in Figure 2.5, other sources of feedback also come from previous musical events that inform the interrupt tester (e.g. goal-based decisions on the musical direction). Indeed, Pressing points out that short-term feedback, such as those from a current musical event, "guides ongoing movements", while long-term feedback, such as those from previous musical events, "is used in decision-making and response selection" (*ibid.*, p.135). These different feedback time scales resonate with the processes of short-term, medium-term, and long-term recall during improvisation (Kenny and Gellrich, 2002: 124). The first process involves recalling musical events that have occurred a few seconds ago; the second process involves recalling older events such as a previous musical phrase; and the last process involves recalling an entire improvisation up to the present moment. Thus, feedback

[60] See Section 2.2.
[61] See Section 2.3.
[62] See Section 2.2.2.

information that comprise reflection-based mental representations are multimodal, possess redundant structures, and operate at different time scales during improvisation.

Interactions and responses from the audience also contribute to the feedback process, which provide visual and/or aural information about how an improvisation is perceived and understood (Chamblee, 2008). When there is little feedback for improvisers, such as in organ concerts where applause takes place after improvisations (*ibid.*, p. 378), the anticipation of the audience's expectation and reception of the music provides another source of feedback. For instance, Després et al. (2017) reports how an organist monitored the duration of her improvisation so to maintain the audience's attention (p. 14). This awareness, similar to experiencing "empathy with the audience" (Kingscott and Durrant, 2010: 135), suggests that improvisers themselves can provide a similar source of audience feedback when they perceive their improvisations from the perspective of a critical listener. In doing so, improvisers distinguish between the two activities of performing and listening, where the former involves 'kinesthetic thinking' (e.g. perception of internal tonal images) and the latter involves 'kinematic thinking' (e.g. perception of external tonal events) (Pike, 1974: 91). Reflection-based mental representations, then, monitor how improvisations are received and understood by recalling the perceived (and/or imagined) responses from the audience. Having presented the different types of feedback that occur during improvisation including their qualities and functions, the next subsection turns to consider how they are used to inform future goals.

2.4.2 Feedback reflection and incorporation

During improvisation, a significant part of the monitoring process is driven by improvisers' reactions to the different types of feedback they perceive. According to Pike (1974), these reactions take place following the perception of realised ideas, where improvisers may experience feelings of expectation, satisfaction, and disappointment among others (p. 90).

> "The interplay of tonal images in a jazz improvisation and their successful transformation into projected tonal events are accompanied by affective reactions on the part of the soloist. He is in a state of anticipation. His feelings do not come from the images themselves but by his acting upon them – by his spontaneous *invention* of such images." (Pike, 1974: 90).

That tonal events rather than tonal imagery are involved in eliciting improvisers' reactions suggest the existence of intended and actual representations of musical events, a point that

agrees with Pressing's (1988) model. In addition, disappointed reactions may imply that 'tonal imagery'[63] are not precise blueprints of foreseeable musical ideas, but instead are a set of constraints for its transformation into tonal events. Similarly, the 'analytical representations' in Pressing's model act as a set of constraints for the generation of a new musical event. This may be the reason why Pike (1974) proposes that "fruitful invention" during improvisation is a "process similar to trial and error guided by knowledge", where "the jazz soloist does not know that his idea is good until he uses it" (*ibid.*, p. 91). Furthermore, recalling back to Section 2.2.2, improvisers' reactions to the actual performance are also featured in Pressing's (1988) model. In particular, the interrupt tester reflects on feedback from a previous musical event to make musical decisions, including whether "the improviser has had enough of the [current] event train…(for whatever reasons) and breaks off into a different musical direction" (*ibid.*, p. 155). The monitoring of the actual improvisation, then, involves a process of feedback reflection where musical decisions are influenced by improvisers' reactions to previous musical events.

In Pressing's (1988) model, feedback from multiple sources are also incorporated into the array generator[64] where intended aspects for a new musical event (e.g. constraint-based goals) are generated. This process includes combining information from short-term, medium-term, and long-term recall of previous musical events, as well as sounds from other players, the musical stimulus, main goals of the performance, and the improviser's memory. Furthermore, intended aspects and analytical representations from previous musical events are also considered (*ibid.*, p. 154). The incorporation of this information, in tandem with improvisers' reactions to the actual performance, strongly suggest that improvisers monitor whether or not previous goals have been successfully realised. Thus, reflection-based mental representations involve a process of feedback incorporation, where multiple sources of information about the actual performance are combined together to inform future goals. Having discussed the different processes that are involved during the monitoring of the actual performance, the following subsection turns to consider how the recollection, reflection, and incorporation of feedback are carried out during improvisation.

[63] See Section 2.3.1.
[64] See Sections 2.2.2 and 2.3.1.

2.4.3 Metaphorical meanings

The recollection, reflection, and incorporation of feedback during performance involve many ways of understanding and organising information. Jazz improvisers, for example, often employ long-term recall to remember entire tunes. The recollection of these tunes is accompanied by the improvisers' emotional reactions, which suggests that feedback reflection is also a common process used to understand and evaluate the actual performance.

> "There is a constant spending and replenishment of a player's emotional reserves. Israel performs "tunes that have different emotional states" in order to give himself "different things to think about, different things to feel and to play" when he improvises. Each tune has "its own feelings, its own shapes and patterns that occupy me when I play it," he explains…Sometimes, Emily Remler says, "when I play a ballad like 'I'm in a Sentimental Mood,' I feel almost sick to my stomach because it is so heartrending and takes so much from me." (Berliner, 1994: 203).

Furthermore, the improvisers' emotional associations to the music are examples of extra-musical meanings, a type of 'referential semantics' (Leman, 2010) that comprise meanings outside music, including metaphors and expressions of passion (p. 50). The improvisers' emotional representations of their performances also illustrate a type of emotional aspect[65] from Pressing's (1988) model. In Israel's case, feedback redundancy is highlighted by the connection between the musical aspect (e.g. tune), the emotional aspect (e.g. feelings), the acoustic aspect (e.g. shapes), and the movement aspect (e.g. patterns). Moreover, Israel's focus on his feelings suggests that emotional metaphors are used to organise different information about his improvisation, and also guide the development and implementation of new ideas. Indeed, Pressing has pointed out the significant role of a metaphor in combining the different types of feedback information to inform future goals.

> "Novel actions are built primarily by distorting aspects of existing ones. This sheds light on the organizing power of the metaphor, mentioned earlier, since it may be considered to be a global link across categories, one that facilitates movement integration. In other words, the image or metaphor enables the co-ordinated modification and resetting of whole classes of array components in a fashion ensuring spatial and temporal coherence." (Pressing, 1988: 162).

In particular, the use of a metaphor indicates the process of feedback incorporation where different types of feedback are combined through "a global link across categories", which then inform goals through the "modification and resetting of whole classes of [intended] array

[65] See Section 2.2.2.

components." Similarly, Godøy and Jørgensen (2001) proposed the notion of improvisers forming a 'metaphorical conceptualization' (p. 14), which is supported by Campbell's (1991) examples of how the use of colloquial and metaphoric language ("to wing it", "to blow it out") plays an important role for describing the experience of improvising (p. 21). As the following example shows, metaphors lend well to feedback redundancy, which makes them effective tools for shaping the recollection, reflection, and incorporation of feedback during the monitoring process.

> "[W]hen playing solo, the guitarist must convey the whole atmosphere of flamenco. The falsetas become much more elaborate and musical to resemble the singing. The rhythm becomes stronger and more elaborate to resemble the 'foot-work' of the dancer." (Bailey, 1992: 14).

In this case, the flamenco acts as an extra-musical metaphor for the guitar improvisation, which drives the guitarist's long-term recollection of falsetas and rhythms; the expectation of imitating the singer and dancer; and the incorporation of both information into the goal of conveying the whole atmosphere. In terms of Pressing's model, the metaphor also links together the musical (e.g. falsetas/singing), visual (e.g. dancer), movement (e.g. rhythm/foot-work), and acoustic aspects (e.g. guitar solo) of the guitar improvisation. Finally, the guitarist's intention to convey the atmosphere of flamenco indicates the construction of 'collaborative semantics' (Leman, 2010), where meanings emerge from social musical interactions between the guitarist and the audience (p. 55). Thus, the management of multiple feedback during the monitoring process is facilitated by the construction of collaborative and referential (extra-musical) meanings, which include emotions and metaphors.

To sum up this section, Lehmann's (1997) model was used to present the third and final conceptualisation of improvisers' reflection-based mental representations, which involves the monitoring of improvisations through feedback. In particular, the monitoring characteristics identified in Pressing's (1988) and Pike's (1974) work can be categorised into three processes. In Pressing's model, the process of feedback recollection features as short-term and long-term recalls of previous musical events, while the recall of audience feedback is discussed by Pike. Meanwhile, the process of feedback reflection is unpacked in Pike's work, which is described as improvisers' reactions to feedback and its influences on decision-making. The process of feedback incorporation is illustrated in Pressing's model as the combination of multiple feedback sources to inform future goals. Finally, the construction and application of

metaphorical meanings identified in Leman's (2010) framework highlights the redundant and multimodal characteristics of feedback information. These conceptualisations of reflection-based mental representations, then, illustrate improvisers' different ways of understanding and organising feedback information during improvisation. Thus far, having explored in this chapter the three concepts of goal-based, production-based, and reflection-based mental representations, the next section brings these conceptualisations together to present the key research gaps that have been identified in the improvisation literature.

2.5 Statement of research gaps

Reflecting back on the critical overview and conceptualisations of professional improvisers' 'mental representations', the final section captures the main points discussed in this chapter to put forth three key research gaps that remain unanswered in this literature. First, is the need for more research on the relationship between what improvisers have learned and their improvisations (Nettl, 2009). While several studies have looked at how expert improvisers memorise music (Noice et al., 2008; Ockelford, 2012), along with investigations on improvisers' strategies in relation to what has been improvised (Norgaard, 2008; Chamblee, 2008), there is little research that focus on both the learning and improvisation phases.

Building on the former, the second gap concerns the lack of research on the role of the musical stimulus during improvisation. Despite its significance and common usage in many improvisation practices, the musical stimulus is briefly referenced in several improvisation models (Clarke, 1988; Pressing, 1988; Pike, 1988), and few studies on its role and function exist.

Third, there is a gap in the understanding of musicians' 'mental representations', including how they are acquired and used in music learning and performance (Lehmann and Ericsson, 1997). While limited research has strongly implied the presence of mental representations during improvisation (Berliner, 1994; Limb and Braun, 2008), the lack of theoretical models describing improvisers' mental representations prevents the advancement of further knowledge in this area.

As a way to address these gaps, what is needed is a working conceptualisation of 'mental representations' to use as a lens for examining how professional improvisers learn a new

musical stimulus and then improvise on it. This working conceptualisation is summarised in the next subsection.

2.5.1 A working conceptualisation of 'mental representations'

Drawing from the previous sections, the following main points have been put forth to summarise the three kinds of mental representations that were conceptualised in this chapter:

(1) Mental representations are "embodied structures" (Johnson, 1987: xxxv) that play a role in how we make sense of and understand music, and forms a significant part of the musical meaning formation process (Leman, 2010: 46). In particular, mental representations are involved in the formation of six types of meanings: representational semantics, referential (extra-musical) semantics, referential (intra-musical) semantics, causal semantics, corporeal semantics, and collaborative semantics (Leman, 2010).

(2) In the context of musical improvisation, mental representations comprise knowledge structures (Clarke, 1988) as well as processes (Pressing, 1988). As knowledge structures, mental representations manifest as different levels of goals, multimodal forms of feedback, and different types of meanings. As processes, mental representations are involved in decision making, the production of ideas, and the monitoring of the performance.

(3) The dynamic nature of mental representations and the various roles they are involved in suggests that there are multiple types of goal-based mental representations, production-based mental representations, and reflection-based mental representations in the musical improvisation process.

These three main points serve to inform the nature of the emergent research questions and the choice of a qualitative methodology in the following chapter.

2.5.2 Statement of research questions

Having summarised and distilled the identified research gaps in the existing literature, this chapter concludes with an overarching research question supported by two sub-questions. In particular, the overarching research question draws from the three key research gaps that were listed, and the first main point in Section 2.5.1. Meanwhile, the two sub-questions are linked to the second and third main points in Section 2.5.1.

Box 2.2: Statement of research questions

What characterises the nature of improvisers' perceived mental representations before, during, and after a thematic musical improvisation?

1) Drawing on Leman's (2010) framework of "embodied approach to music semantics", how are meanings implicated in the formation of mental representations?

2) How is Lehmann's (1997) model of "acquired mental representations in music performance" evidenced in terms of the roles implicated in their improvisations?

The next chapter, then, turns to consider the epistemological position of the present study and discusses the assumptions underpinning the concept of 'mental representations'. The roles of reflexivity and researcher positioning are also considered. This is followed by a presentation of the methodology and methods chosen to answer the above research questions.

2.6 Chapter summary

A lot of information can be gained about the improvisation process by studying improvisers' experiences. This chapter has looked at a number of studies that suggest the presence of certain 'imagery' within improvisers' experiences. Such imagery has been termed in this thesis and other works as 'mental representations'. In order to conceptualise these mental representations, this chapter has reviewed a number of theoretical work from various fields. In particular, Leman's (2010) framework of '*An embodied approach to musical semantics*', central to this thesis, views these representations as embodied structures of meaning-making. In order to situate Leman's framework in the context of improvisation performance, this chapter appeals to Lehmann's (1997) model of *Necessary Tripartite Mental Representations*, which requires musicians to assume three mental representations comprising (1) the desired performance goal, (2) the production aspects, and (3) the actual performance. This chapter validates the combined Leman-Lehmann conceptual framework by examining how it stands with respect to three models of the improvisation process by Clarke (1988), Pressing (1988), and Pike (1974). This provides not only further understanding to the works by Leman (2010) and Lehmann (1997) but also raises a number of important and previously unexplored questions. This chapter ends with a statement of the most pressing research gaps and the research questions the present study aims to answer.

PART II: RESEARCHING 'MENTAL REPRESENTATIONS' IN THEMATIC MUSICAL IMPROVISATION

Chapter 3: From methodology to methods

Having thus far expounded and conceptualized 'mental representations' in the former chapter, the present chapter first turns to justify the epistemological and theoretical grounds of the study. Next, the present chapter defends the methodology and methods adopted for answering the research questions. Section 3.1 sets forth to examine the assumptions behind the concept of 'mental representations', thereby establishing the interpretivist-social constructivist position of the study. In Section 3.2, the chapter moves to introduce and argue for a phenomenologically-informed qualitative methodology, with a further focus on a phenomenologically informed multiple-case study. The rational for the choice of data collection methods are presented in Section 3.3, followed by a report of the pilot study on testing the methods in Section 3.4. In Section 3.5, the research design of the study is presented, with the lessons from the pilot study applied therein. Finally, the chapter closes with the analysis procedures that were adopted, and considers issues of ethics, and the quality and trustworthiness of the findings.

3.1 An interpretivist – social constructivist epistemology

Researchers are widely advised to identify the 'worldviews' (Creswell, 2008: 6) that they espouse prior and during the development of a study's methodology. Essentially a "basic set of beliefs that can guide action" (Guba, 1990: 17), a particular worldview holds many underlying assumptions that significantly affect how the specific procedures for a study are conducted. For this reason, establishing the researcher's suppositions about their topic under study is a crucial step for rationalizing their choice of methodology. Such worldviews, however, are generally subtle and deeply embedded (Slife & Williams, 1995), rendering difficulties in defining the often-veiled assumptions that characterises it, and how these will shape a study's research approach. A more concrete means of addressing this issue is to use the research questions as a starting point (Tashakkori & Teddlie, 1998), as they were formed based on what the researcher has postulated about the topic. In what follows, then, I proceed to make explicit the philosophical issues that underlie what I "silently think" (Scott and Usher, 1999: 10) about researching 'mental representations', and by doing so, I move towards justifying the emerging choice of my study's methodology.

3.1.1 Assumptions underpinning 'mental representations'

From reviewing the research questions earlier stated in Section 2.5.2, several assumptions can be identified. The foremost and prominent assumption is that 'mental representations' are constructed phenomena that occur as "individuals develop subjective meanings of their experiences" (Creswell, 2008: 8). Although this denotes 'mental representations' as having ephemeral and transient qualities (Godøy and Jørgensen, 2001), access to its seemingly unobservable nature can be mediated by examining a person's description of their experiences (Leman, 2010; Norgaard, 2008). Next is the assumption that 'mental representations' occur as part of a mental and physical experience, and hence, bodily perceptions also contribute to its construction. 'Mental representations', then, are understood to comprise various combinations of one's multisensory experiences, which include their aural, visual, and kinetic perceptions, as well as their emotional associations (Berliner, 1994; Bailey, 1992; Pike, 1974). Lastly, this study considers 'mental representations' as an inherently social construct that is formed through the involvement and exchange of any type of communication. This would include, then, the contexts of improvisers engaging with their audiences in a live performance, or being inspired by ideas from a musical recording (Sawyer, 1997; Benson, 2003; Tomlinson, 2013).

Rooted within these assumptions, the present study espouses a *relativist* ontology, which recognizes that the different worlds inhabited by different people may "constitute diverse ways of knowing, distinguishable sets of meanings, separate realities [*sic*]" (Crotty, 1998: 64). That is, the study adopts the stance that 'mental representations' occur as various social constructs of multiple realities, and as such, rejects the notion of 'mental representations' as prevailing in one objective form. Furthermore, this ontological position is inseparably connected to the epistemology that underlies the study, which concerns the rationale for obtaining specific knowledge through viable means, and ensuring its trustworthiness in the process (Maynard, 1994).

In specifying an ontology as such, the present study rejects the epistemological position of objectivism. With its assertion that reality exists independently from our minds, and can be understood through only one true explanation (Scott and Usher, 1999), the conviction held by objectivism is conversely at odds with the relativist ontology. On the other hand, *constructivism*, or *social constructivism* (Pollard, 1990; Creswell, 2008) offers a paradigm

that acknowledges the co-construction of multiple realities through the interactions among individuals. Valuing "transactional knowledge" (Denzin & Lincoln, 2011: 92), social constructivism is "oriented to the production of reconstructed understandings of the social world" (*ibid*.). Ultimately, the knowledge that we obtain is inextricably linked to the "specific contexts in which people live and work" (Creswell, 2008: 8), and is based on subjective meanings that are "negotiated historically and socially" (*ibid*.).

At the same time, this study acknowledges that a number of the improvisation models and mental representation theories it has drawn from are positioned in significantly different paradigms, of which several have adopted quantitative approaches. A major limitation of a multiparadigm-influenced enquiry such as this study is the threat of "ethnocentric bias – a contamination of paradigm accounts from the [researcher's] home culture" (Lewis and Grimes, 1999: 687). One way to safeguard against this limitation is to make clear the study's underlying assumptions, and to "constantly question the limits of their chosen lens", as this study has sought to do in the present and previous chapters (*ibid*., p. 686). Despite the major limitation, a multiparadigm enquiry "is most appropriate for studying multifaceted phenomena characterised by expansive and contested research domains (i.e., with numerous, often conflicting theories)" (*ibid*., p. 678). In particular, it helps the researcher to identify and use "transition zones", or "theoretical views that spans paradigms" as a point of research enquiry, which may often result in a contribution in the form of "paradigm bridging" (*ibid*., p. 674). In this study, the notion of skilled improvisers 'mental representations' has been identified as a transition zone across the fields of phenomenology, music psychology, music ethnography, and music education, among others. Especially useful in theory building and theory advancement, a multiparadigm enquiry also offers a form of "metatriangulation", by encouraging the researcher to "immerse themselves within each paradigm" and "to consider conflicting views simultaneously" (*ibid*., p. 676, 683, 687). Furthermore, the incorporation of theories from multiple paradigms enables the researcher to obtain a "metaparadigm perspective", which can enrich a topic especially "during the phase of theory-building", where "each paradigm is seen as contributing a layer of meaning" (*ibid*., p. 687).

Resuming the discourse on social constructivism, Scott and Marshall (2009) have pointed to its distinction from *constructionism*. Although the two terms are often tightly linked, *constructionism* focuses on a global level of *collectively* generated meanings (Crotty, 2005).

However, this distinction between social *constructivism* and social *constructionism* is not always made clear in the methodological literature. The works by Pollard (1996) and Lock & Strong (2010), which are considered seminal texts that showcases the two epistemological positions, present such an example. For instance, Pollard (1996), who examined the social world of children's learning, presents his *social constructivist* work as identifying "the processes by which people make sense in social situations" (p. 7). On the other hand, Lock and Strong (2010) assert that *social constructionists* are "interested in delineating the processes that operate in the socio-cultural conduct of action to produce the discourses within which people construe themselves" (p. 7). Both of these definitions seem to focus on the processes of how people form their understandings, and there appears to be no indication that one approach is focused more on processes of an *individual*. Although Lock and Strong (2010) make a reference to the 'constructivist approach' of George Kelly (1955) who examines 'meaning' as an *individual*, idiosyncratic project (p. 25), the relationship to constructionism was not unpacked further. Meanwhile, Pollard (1996) does not appear to mention social constructionism in his book, although he has drawn two 'global' themes from a collective analysis of four cases. However, the bulk of his analysis presents each child's narrative on a case-by-case basis, which offers some insight into the more *individual*-driven nature of his social constructivist work. It seems, then, that the social *constructivist* approach adopted in the present study is especially well suited for the in-depth examination of how improvisers construct their 'mental representations' on the *individual* level, by focusing more on idiosyncratic features.

Furthermore, both Pollard (1997) and Lock and Strong (2010) have emphasized on the crucial role of interpretation in both social *constructivism* and social *constructionism.* In particular, Creswell (2008) discusses how researchers adopting a social constructivist approach ought to acknowledge the internal influences of their interpretations:

> Researchers recognize that their own backgrounds shape their interpretation, and they position themselves in the research to acknowledge how their interpretation flows from their personal, cultural, and historical experiences (Creswell, 2008: 8).

As Creswell (2008) asserts, researchers cannot expect to be able to bracket out their own experiences completely. As the researcher, I must interpret the meanings that have been developed by improvisers in order to understand the construction of their perceived

experiences (Smith, Flowers, and Larkin, 2009). Furthermore, Crotty (1998) points out how the researcher's interpretations are inextricably linked to the context and the setting in which the study was conducted. By personally visiting and gathering information from a particular setting, the interactions between myself and the improvisers form a part of the knowledge and meanings that are generated within that context. Additionally, researchers adopting the social-constructivist approach must also make clear what their interpretations can bring to their study, which is a concern that is addressed by a theory of interpretation known as hermeneutics. The role of hermeneutics in the present study will be discussed further in Section 3.2.1. In particular, Smith, Flowers, and Larkin (2009) interrogates the interpretative role of the researcher in more detail:

> "What are the methods and purposes of interpretation itself? Is it possible to uncover the intentions or original meanings of an author? What is the relationship between the context of a text's production (e.g. its historical genesis in the distant past) and the context of a text's interpretation (e.g. its relevance to life in the present day)?" (Smith, Flowers, and Larkin, 2009: 21-22).

Amidst these questions, Smith et al. (2009) points out that one of the goals of a researcher's interpretation is to find the *original meanings* that were constructed by the participants. The focus on the participants' constructed meanings is also emphasized in the social constructivist approach. According to Pollard (1996), social constructivism holds a "fundamental assumption that people are active and make decisions on the basis of meanings" (p. xiv). Focusing in further, Pollard (1996) explains that "social constructivists provide insights on the processes through which people come to 'make sense' in particular social and cultural situations" (p. xiv). The role of interpretation, then, functions as a tool within the social constructivist approach. In particular, the use of interpretation in the present study entails examining the improvisers' meaning constructions from their perceived experiences, in order to understand how their 'mental representations' are constructed. Thus, a researcher guided by the lens of social constructivism also takes on a participatory role in their own study, being interactively involved with the creation and the *interpretation* of the findings (Guba & Lincoln, 1994).

3.1.2 Constructing 'mental representations' and meanings

In what ways, then, does the social constructivist approach manifest in the present study? Crotty (1998) identifies three inherent assumptions that appear to predominate in most social

constructivist approaches: (1) sharing socially constructed meanings, (2) understanding and interpreting the historical and cultural contexts, and (3) generating knowledge through social interactions (page number needed). Contemplating over each assumption, then, the construction of meanings constitutes the core of 'mental representations', which seeks to explore the multiple forms of constructed meanings that an improviser and the researcher (e.g. myself) might share from our respective performing and listening experiences. Second, 'mental representations' are tied to their specific settings as well as their cultural and historical contexts, which are constructed from and informed by the personal backgrounds of each improviser. Third, 'mental representations' assume that knowledge, in the form of co-constructed meanings, is created and accessed through social interactions, especially in exchanges that include more than one mode of communication.

In sum, thus far, this section has established and justified the relativist ontological stance of the study, which is grounded in the epistemology of an interpretivist-social constructivist approach. Accordingly, the study is founded on the assumption that 'mental representations' are subjective phenomena, which are constructed from multiple realities by different individuals. Furthermore, in the present study, 'mental representations' are constructed within a social context that includes the experiences and the interpretations of both the improviser and the researcher. As such, the knowledge of how improvisers construct their 'mental representations' can be accessed through different forms of social interactions, and can be understood by interpreting the meanings developed by improvisers.

3.1.3 Researcher reflexivity and positioning

In Section 3.1.1, the discussions on the role of interpretation in a social-constructivist approach had brought forth several issues on the impact of the researcher's internal influences. According to Creswell (2008), researchers should undergo an important step in acknowledging how their own experiences might influence their interpretations of the participants' meanings. This brings in the role of reflexivity in research, which refers to "how people co-construct their realities through their interactions" (Lock & Strong, 2010: 195). In particular, the researcher should reflect on how they are positioned in the field of their study, and the roles they assume as such. This section, then, serves to examine my relationship to the present study by considering my musical background, and how my experiences have shaped and led me to this research topic.

Reflecting back to my musical background, then, my first formal experiences in musical improvisation occurred when I was thirteen years old. During this time, I had joined a "jazz improv" class at my school. By then, I had received eight years of classical training on the piano, while also attending a separate class in written music theory. However, it was my jazz teacher, a professional trumpet player, who had first shown me how the inversions of a chord could achieve different colours of sound on the piano. Essentially, this class presented a brief opportunity where I needed to employ my knowledge of music theory in my performance practice. Having attended the class for only a year, the necessity of merging of my music theory knowledge with performance practice was short-lived.

When I continued my focus on my classical piano training in university, I found that my music theory classes remained separate from my performance training. Most of my degree requirements were directed at learning and perfecting a few musical pieces from the 'canon' of the piano repertoire. However, it was from my music history classes where I learned of the central role that musical improvisation had once held in the lives of composers J.S. Bach, Ludwig van Beethoven, and Franz Liszt, among others. It struck me as odd that the practice of improvisation, which was once a major tradition in the western art musical genre, was completely marginalized in my curriculum. Additionally, I was lacking a complete understanding of the piano repertoire I was learning, because I was not employing my knowledge of music theory in my performance practice in a way that my jazz improv class had required me to do.

As I began to research more into the topic of musical improvisation, I was drawn towards understanding the process of how it worked. Like Calvin Hill from Berliner's (1994) study, many of the jazz improvisations recordings I studied sounded like 'magic' to me, as if the notes were "pulled out of thin air" (Berliner, 1994: 1). When I met with the improvisers who had agreed to act as participants for the present study, they were well aware of my position as the 'outsider' of the field of musical improvisation practice. I assumed my main role as an outsider in two ways. First, I was a researcher affiliated with an academic institution. The interviews, however, took place in as much of a naturalistic setting as possible, within the participants' homes. Although some time and introduction were needed, all of the improvisers were able to adjust and 'bracket' out the research component of the interview within minutes, and perform an improvisation as they normally would. Second, I was not a skilled improviser

and did not practice improvisation. In this case, the lack of expertise was more advantageous for me as I was perceived to be less of a 'threat' in terms of judging their playing.

However, I presented myself as a musician with sufficient theoretical knowledge who was keen to learn more about improvisation. I was intrinsically fascinated by the topic of improvisation, and my musical background enabled them to communicate their experiences and thoughts using the technical language of music theory. In particular, I found that my enthusiasm of my research topic also aligned with my participants' interests in sharing their experiences. One improviser, for instance, had encountered discouragement from improvising in his early years, and as such was particularly keen to make the practice of improvisation more accessible to others, including his own students. Both improvisers also maintain professional websites that are regularly updated with their teaching blogs and performing schedules. It is suffice to say, then, that these improvisers were keen to help generate more interest in the practice of musical improvisation by acting as participants in the present study. Moreover, at times during the interview, my non-improviser status placed me in a role where I was the 'learner', and my participants became 'teachers' who explained to me their thinking processes and teaching philosophies. In the interviews, I had also played the role of the audience. During one interview, my participant asked me to share my reactions to his improvisation first before explaining his own interpretation to me. Hence, in some parts of the interviews, I also became a co-creator of the improvisers' meanings and experiences.

To sum up, then, in this section I have illustrated the importance of reflexivity by providing an account of the positions as a researcher and a learner I have assumed in relation to the present study. This act of reflexivity will continue to play a crucial role in informing the rest of the study, especially during the process of interpretation in the analysis procedure, as well as the ethical considerations.

3.2 A qualitative methodology

This section makes a case for adopting a qualitative methodology in the current study. Recalling from the previous chapter that multimodal 'mental representations' are conceptualized as a social construction of people's experiences, the methodological approaches adopted in this study must be able to capture the multiple realities of several improvisers, and account for the social interactions that will occur between the improvisers and the researcher. In addressing the above matters then, the suitability of a quantitative methodology was rejected as this approach does not take into account the improvisers' views of their performing experiences. Stemming from its realist ontology, quantitative research assumes reality to be an absolute truth that is 'fixed' and is deemed verifiable only through reductionist and numeric measures (Creswell, 2008; Denzin and Lincoln, 2005). For this reason also, adopting a quantitative approach would require hundreds of participants which would not be feasible due to the time restrictions of a doctoral study. On the other hand, qualitative approaches typically involve a smaller number of participants, with sample sizes often lying under fifty people (Ritchie et al., 2003: 84). While using a quantitative methodology would increase the statistical significance of my investigation, the access and recruitment of the large number of participants would create logistical concerns that lie beyond the scope of the present study.

Much consideration was given to a mixed methods methodology, which offers the researcher both qualitative and quantitative approaches for collecting and analysing data. The mixed methods designs that were adopted by pertinent music improvisation studies include the concurrent use of questionnaires, pre- and post- test measurements of musical abilities, and a musical improvisation intervention involving graphic elicitation (Shockley, 1980); a combination of semi-structured interviews, musical analyses of improvisation transcriptions, and brain imaging research (Berkowitz, 2009); and incorporating behavioural tasks and improvised performances into a structured interview procedure (Fidlon, 2011). As shown in the above studies, this methodology offers much flexibility for customizing many diverse approaches that would best 'fit' the research problems. The use of mixed methods can also increase the possibility of having different 'worldviews' (Creswell, 2008) emerge from the analysis that may have otherwise been overlooked with the use of just one method.

In considering my research questions, however, it was decided that adopting a mixed methods approach would not be appropriate for the current study for three reasons. First, my research questions required a detailed understanding of improvisers' multimodal experiences and any meaningful relationships that are constructed, which rule out any quantitative methods in favour of qualitative ones that can capture rich descriptions from improvisers. Second, the current study aims to understand the process of how improvisers originate ideas in a holistic manner. This means that the current study does not seek to employ 'reductionist' approaches, such as conducting behavioral tasks involving highly controlled improvising activities on isolated sound variables (e.g. having pianists improvise only on the notes 'C', 'E' and 'G' with the right hand) (See, for example, Limb and Braun, 2008). Instead, the current study values improvisers' sensitivity in their listening and responses to the richness of actual musical excerpts, and considers how this process influences and is related to the more naturalistic and 'complete' improvisations that they can create. Third, to understand the 'multimodal' aspect of mental representations, the current study needs to consider methods that can capture a wide-ranging view of improvisers' representations of music. In addition to improviser's verbal accounts, for example, gaining insight into how they experience visual, kinetic, and emotional associations to music can also be captured by means of drawings (Verschaffel et al., 2009), which can provide a powerful measure of their understanding of the music over any quantitative means (Davidson and Scripp, 1988).

Hitherto, my reasons for rejecting both mixed methods and quantitative methodologies have begun to introduce the benefits of adopting a qualitative approach. Designed to reveal the "multiple meanings of individual experiences, meanings socially and historically constructed" (Creswell, 2003: 18), qualitative research is procedurally centred on what Denzin and Lincoln (2005) calls "a set of interpretative, material practices" (p. 3). These 'practices' as such refer to particular methods of data collection and analyses that incorporate the co-constructed meanings of both the participant's worldview and the researcher's interpretations. The flexible nature of qualitative research designs includes a diverse range of multimodal research techniques that "involves collecting and/or working with text, images, or sounds" (Guest, Namey, and Mitchell, 2013: 3), which can help to capture a wide-ranging view of a participant's multimodal experiences. Further, of key relevance to this study is the phenomenological method, which is one of many research strategies that are commonly associated with the qualitative approach, and will be presented below in Section 4.4.1.

In the present study, taking on these aspects of qualitative research entailed observing and engaging personally with several improvisers in order to acquire an in-depth understanding of their constructed 'mental representations'. This required harnessing my own musical background as a means to interpret and gain insight into other musicians' experiences, which I had begun applying into my research approach from chapter one, Section 3.1, and Section 3.1.3. Additionally, it has necessitated employing a diverse range of methods that can collect data on an improviser's cultural background, emotional associations, and the aural, visual, and kinetic perceptual modes of their multimodal experiences. This includes using music produced by participants (expert improvisers) both as data and a research tool, since "understanding particular stories [*of improvisers*] is made more complete by consideration of the sound worlds that they inhabit and produce" (Daykin, 2008: 152).

3.2.1 An interpretative phenomenological approach

At the same time, adopting the qualitative methodology involves determining, from among several possibilities, the best strategy of inquiry to be employed so as to "provide specific direction for procedures in a research design" (Creswell, 2003: 13). Additionally, researchers should also identify the veiled assumptions nested within the chosen strategy in order to elucidate any subsequent implications on the methods of data collection and analyses. For these reasons, the present study adopted an *interpretative phenomenological analysis* (IPA) approach to qualitative inquiry (Smith et al., 2009). Often referred to as IPA, this qualitative approach, which was first developed by Smith (1996), is "committed to the examination of how people make sense of their…experiences" (Smith et al., 2009: 1). The central components of the IPA approach combine *hermeneutics* (theory of interpretation) and *phenomenology* (a philosophical approach to the study of experience) to examine in detail "what the experience for *this* person is like, what sense *this particular* person is making of what is happening to them" (*ibid*., p. 3). As such, the IPA interest into the details of the *individual* experience aligns well with the present study's interpretivist-social *constructivist* epistemology and the focus on improvisers' idiosyncratic constructions of their mental representations.

Recently, there has been an increase of IPA studies on music improvisation practices and improvisational music therapy programs. The choice to adopt the IPA approach in the present study was largely informed by the following IPA studies on musical improvisation. Among

others, Rose (2012) employed IPA to examine the creative process of free improvisation to better understand its potential to enhance musical learning. In another example, an IPA study by Sansom (2007) resulted in two especially rich case studies, which explored in-depth the relationship between musical improvisation and identity formation. In music therapy research, Pothoulaki, MacDonald, and Flowers (2012) adopted the IPA approach to investigate the benefits of improvisational music therapy interventions by studying the phenomenological experiences of nine cancer patients. As the studies above show, the IPA approach is often combined with a case study design featuring a small number of participants. Additionally, the IPA approach also features the use of *phenomenology*, which was considered earlier to be especially suitable as a research strategy for exploring the phenomena of 'mental representations'. In the subsequent Section, then, the phenomenological strategy is expounded, during which I focus in further to justify employing a phenomenologically informed multiple-case design.

3.2.2 Phenomenologically informed multiple case study

Recognised as both a philosophy and a method (Creswell, 2003; Dowling, 2005), phenomenology is used to "identify the 'essence' of human experiences concerning a phenomenon" (Creswell, 2003: 15) so as to "develop patterns and relationships of meaning" (*ibid*.). Seeking to "account for experience in all its richness" (Lock and Strong, 2010: 39), a constructivist-informed phenomenology is a "systematic investigation of [the] contents of consciousness (*ibid*., p. 33). To develop these patterns and relationships of meaning, phenomenologists study and work extensively with a small number of participants (Moustakas, 1994) to understand their first-hand experiences (Smith, 2013).

Phenomenology is concerned with developing approaches to understand the nature of a phenomenon in multiple ways, including the use of language as a tool (Heidegger, Lock & Strong, 2010: 61). In particular, the notion of intentionality lies at the heart of phenomenology that "defines and reveals the meaning of an object of consciousness" (*ibid*., p. 33), as well as the relationship that arises between them. It assumes that the mind and the world share an "indivisible locus" (*ibid*., p. 32) and that "there is a unity between the mind and that of which it is conscious, and not a duality" (*ibid*., p. 33). As such, the phenomenological approach has much to offer for the present study that seeks for various ways of understanding the embodied experiences of individuals by accessing their and consciousness and intentionality.

The major phenomenological philosophers in this position include the work of Edmund Husserl (1859-1938), Martin Heidegger (1889-1976), and Maurice Merleau-Ponty (1908-1961) (Smith et al., 2009). As the founder of this philosophical position, Husserl proposed that phenomenology should focus on the conscious experiences of an individual (Zahavi, 2003). Drawing on this proposition, Heidegger argues that possessing constant awareness of one's existence as being 'in-relation' to the rest of the world – or the context – is also fundamental to the study of an individual's experience (Larkin et al., 2006).

Adding to this more contextualized view of phenomenology, Merleau-Ponty further suggests that bodily perceptions are what shape the experiences and knowledge of an individual (Anderson, 2003). The collective phenomenological views of these philosophers, which have been broadly presented in terms of individual consciousness, contextual awareness, and bodily perceptions, affords a philosophical position in which I can obtain further knowledge on mental representations through a person's description and explanation of their re-constructed perceptual experiences, while also considering the potential influences from their personal backgrounds and belief systems.

At this point, it is worth noting that in his view Heidegger had brought forth the significance of an individual's interpretation of the world around them as they try to make sense of their existential experiences within their surroundings and context. Through this observation, Heidegger has effectively linked the philosophical position of phenomenology with hermeneutics, which is the theory of interpretation (Moran, 2000). In light of Heidegger's phenomenological views, the impact of an individual's interpretations of their experiences should be considered. The consideration of hermeneutics should also be extended to my responsibilities as a researcher, in terms of maintaining a validity of the phenomenological approach by taking care not to impose my own knowledge as I reinterpret a person's account of their experiences (Nardone, 1996).

According to Lester (1999), the phenomenological approach can be applied to a single case or a small sample of participants. Moreover, the case study design is often combined with the IPA approach (Smith et al., 2009: 30) adopted into the present study. Thus, in the present study, the interpretative phenomenological approach was used in conjunction with a multiple-case design, to provide for the study's aims to illuminate the experiences of a small group of improvisers. Unlike a single case study, which focuses on *unique*, *critical*, *revelatory*,

representative, or *longitudinal* examples (Yin, 2014: 47-49), a multiple-case study is used for two research aims: (1) to replicate the conditions of each case so as to provide compelling evidence for the initial propositions of the study; and (2) to develop, based on the findings, a complex theory explaining the conditions that allow a particular phenomenon to occur (Yin, 2014: 54). Furthermore, a multiple-case study is also multi-context; it allows "the researcher to analyse within each setting and across settings" (Baxter & Jack, 2008: 550). The purpose, then, was to use phenomenology as a lens to collectively explore the multimodal experiences of several improvisers in different contexts, in order to develop a theory on what mental representations are formed and used. In other words, a phenomenologically informed multiple-case study was adopted in the study.

Predominantly, the decision to adopt a multiple-case study was informed by the study's evolving research questions. By focusing on the 'mental representations' of *several* improvisers, each improviser became a 'case'. In order to clearly define the boundaries of each case, Yin (2014) has provided two recommendations. First, a case can be defined by entities including an individual, an event, a decision, a programme, or a process. Second, a study should have as many propositions as possible, to avoid being "tempted to cover "everything" about the individual(s), which is impossible to do" (p. 29). According to Yin (2014), the use of a multiple-case study, driven by replication logic, is intended to test and revise a study's propositions with several cases. In particular, each case should be selected carefully so as to (1) reproduce, and thus, predict the same results, or (2) produce contrasting results that have been anticipated.

Applying Yin's (2014) recommendations to the study, then, the bounding of a case, as indicated by the research questions, is delineated to each improviser and their improvisations. Furthermore, the literature-supported propositions identified therein are two-fold. First, is the empirical-based proposition that improvisers construct 'mental representations' that are multimodal in nature. Second, is the theoretically driven proposition that these multimodal 'mental representations' can manifest in specific ways. Specifically, this refers to improvisers' constructions of relationships between their past experiences and their multimodal responses to their improvised music. Adhering to Yin's advice that "the initial step in developing the [*multiple-case*] study must consist of theory development" (p. 56), I had presented, in chapter two, how the theoretical works by Pressing (1988), Clarke (1988), Pike (1974), Lehmann

(1997), and Leman (2010), among others, have informed my research questions. Later, in chapter three, I had justified its use as a theoretical basis for the study's methodology. A multiple-case design, then, enables the development, testing, and a collective understanding of a theory of 'mental representations' in the context of improvised musical performances, within a phenomenological and (multimodal) perspective.

Several writers have also raised the issue of distinguishing between the use of a *holistic* and an *embedded* multiple-case study (Tellis, 1997; Baxter & Jack, 2008). A holistic multiple-case design focuses on one unit of analysis to reach a global understanding of the subject under study, whereas an embedded design involves multiple units of analyses. My phenomenologically informed multiple-case study was of the *embedded* variant, which reflects the subunits of analysis that have been identified from the literature, the informing theory, and the research questions. Specifically, these subunits include the multisensory aspects of improvisers' experiences (auditory, visual, and kinesthetic), their emotional associations, the relationships they have constructed from their associations, and their improvised performances. Thus, the process in which improvisers' 'mental representations' are manifested is also of interest, with these embedded units of analyses from each case allowing for such information to emerge.

To summarise this section, then, I have provided the rationale for adopting a qualitative methodology to answer my research questions. I have also introduced and provided the justifications for adopting a phenomenologically informed multiple-case study. There are three reasons that underlie this rationale. First, my research questions called for an in-depth examination of several improvisers' 'mental representations'. Second, my decision to adopt a phenomenological approach is supported by the epistemological considerations of social constructivism, which acknowledges improvisers' personal experiences as being both socially constructed and multimodal in nature. Third, the replication logic driving the multiple-case design allows the testing of the study's propositions, and the development of a theory that can explain the nature, formation, and role of improvisers' 'mental representations'. With this foundation established, the next section turns to focus on the methods of data collection.

3.3 Data collection methods

As previously discussed, qualitative research and particularly a multiple-case study, allows

the use of a variety of data collection methods to be accomplished within a manageable time frame (Creswell, 2012; Denscombe, 2007). Furthermore, Smith et al. (2009) states, "IPA requires 'rich data'…there is great room for imaginative work in collecting data for IPA. This is an approach which benefits from detailed engagement with a small sample, from accessing the chosen phenomenon from more than one perspective, or at more than one time-point, and from the creative and reflective efforts of the participants" (p. 56-57). In particular, Smith et al. (2009) advocates the use of semi-structured, in-depth one-to-one interviews. With my focus to understand improvisers' 'mental representations' and their constructions, the present study employed two methods: (1) interviews, which incorporated two elicitation tools: music and graphic elicitation; and (2) observation. The choice of these 'nested' elicitation tools follows several researchers that have earlier investigated the experiences of musical improvisation within a social context. In particular, the present study builds upon the methods employed by Burnard (1999: 119), Norgaard (2008: 53) and Shockley (1980: 123), who have embedded one or both elicitation techniques into their interviews to understand the improvising experiences of children, expert musicians, and college students respectively. The use of multimodal methods also enables participants 'to grasp and make sense of what they think in varied ways' (Burnard, 1999: 333). Additionally, employing a more naturalistic context also allowed the present study to consider the emotional, embodied, and social factors involved in the improvisation process (Monson, 1996). Previous studies of improvisation have employed quasi-naturalistic settings to work with children (Burnard, 1999); university students (Seddon, 2005); and expert classical and jazz improvisers (Nardone, 1996; Norgaard, 2008). In all of these studies, open or semi-structured interviews were employed together with particular elicitation techniques (such as an aural stimulus) in order to clarify and understand the social and perceptual factors of the improvisation process from the participants' perspectives. As such, it was decided that the musical activities would be embedded within a semi-structured interview in order to obtain knowledge of how certain factors, including improvisers' personal backgrounds, have influenced their performances. The following section, then, expounds on the limitations and strengths for each of the four methods.

3.3.1 Interviews

Considering that the emphasis of qualitative research is on understanding multiple realities, as they are experienced, perceived, and constructed by participants, interviews were used as a

central method to acquire such information. The benefits of interviews lie in allowing the researcher an opportunity to (a) access a participants' life-world first-hand (Kvale, 1996); (b) explore phenomena that cannot be documented through quantitative methods (Gill, Stewart, Treasure & Chadwick, 2008); (c) offer a flexible setting to integrate other methods, such as music (Allett, 2010) and graphic (Bagnoli, 2009) elicitation techniques; and (d) follow up or clarify on particular topics of interest (Fontana & Frey, 2000). While interviews have some limitations, including time consuming data analysis, occurrences of 'reactive effects' (where participants respond in ways they perceive to be acceptable), and 'investigator effects' (where data can be distorted due to bias), this method provides access to understanding the ways participants think and their internal meanings (Johnson & Christensen, 2000). To acquire knowledge of improvisers' 'mental representations', such information on their internal meanings and ways of thinking is critical for explaining what and how their constructions specifically manifest within different contexts. Essentially, the interviews served the purpose of documenting data that can unveil the hidden multimodal associations and relationships constructed during the improvising experience, which are recognized as key elements of the concept of 'mental representations' (Pike, 1974).

Semi-structured interviews were conducted with several expert improvisers, which comprise a set of pre-established questions that follow a flexible format (Wellington, 2000). Kvale (1996) provides nine different types of questions that can be asked during a semi-structured interview: (a) *introducing questions*; (b) *follow-up questions*; (c) *probing questions*; (d) *specifying questions*; (e) *direct questions*; (f) *indirect questions*; (g) *structuring questions*; (h) *silence*; and (i) *interpreting questions* (p. 133-135). During the interviews, I used a combination of *follow-up*, *probing*, *specifying*, *direct*, and in particular, *interpreting* questions, which were essential for clarifying the participants' abstract descriptions of their experiences. To elicit rich descriptions from the improvisers, I adopted the interview procedure from Nardone (1996), which involved asking open-ended questions about improvisation that centered on: (1) sensing the instrument; (2) experiencing the body (including multi-sensory experiences); (3) time and space; and (4) awareness of the audience (Nardone, 1994: 74). Working with such open-ended questions, my priority during the interviews was to remain engaged in 'active listening', which refers to the ability of the researcher to actively listen to their interviewees, which, as Kvale (1996) notes, "can be more important than the specific mastery of questioning techniques" (p. 132). Thus, the purpose of semi-structured interviews were to: (1)

acquire specific information on the multimodal associations improvisers experience, and what relationships are constructed in relation to their 'mental representations', and (2) to allow unexplored issues to surface in the discussions (Robson, 2011).

3.3.2 Music elicitation

Guided by the research questions, two elicitation techniques were embedded into the semi-structured interviews. One was the use of music elicitation, which served two intentions: (1) to establish a live performance context that is replicable in a multiple-case design for studying improvisers' 'mental representations', and (2) to conduct an audio-stimulated retrospective think-aloud protocol for exploring improvisers' ways of thinking. In particular, several improvised performances, based on a given musical stimulus, were documented as data that was produced by improvisers.

The use of a *musical stimulus* served two purposes in the study. First, in addressing the demands of the research questions, it provided the opportunity to observe how improvisers' initial reactions towards the stimuli come to evolve into their 'mental representations' during their improvisations. Second, by providing the same musical stimulus to all participants, I have satisfied Yin's (2014) criterion of using replication logic in a multiple-case design, which should aim to "duplicate the exact conditions of the original experiment…[*so as to*] provide compelling support for the initial set of propositions" (p. 54). Essentially, the purpose of replication is to increase the chances of establishing common attributes and patterns across multiple cases, thus making the evidence more robust. In cases where the intention is to predict contrasting results (Yin, 2014; p. 54), the repetition of the same stimulus can nevertheless elicit unique responses from each improviser in terms of the images they experience, thus ensuring variability (Pike, 1974). Furthermore, the use of the same musical stimulus on multiple participants to study their responses have been documented in works by Shockley (1980), Davidson et al. (1988), Bamberger (1991), Barrett (1997), Dunn (1997), Elkoshi (2003), Blair (2007), and Norgaard (2008).

Among different types of musical stimuli, which include the use of a music score (Shockley, 1980), or playing a beat track for soloists (Norgaard, 2008), or an audio-based stimulus (Ockelford, 2012; Davidson et al., 1988; Elkoshi, 2003), the latter was chosen for use in this study. The criteria for choosing the musical stimulus required: (a) having a memorable

melody and a simple harmony[66]; (b) is of a manageable length; (c) harbours musical elements that are transferable across several genres including liturgical, classical, jazz, popular music; and yet, (d) is not *immediately* familiar to the improvisers in order to encourage spontaneity. To this end, the chosen musical stimulus was a recording of George Shearing, an American jazz pianist, playing an adaptation of the pop tune, 'Answer me', written by composers Gerhard Wrinkler, Fred Rauch, and Carl Sigman. The twenty-two second recording comprised an acoustic piano playing, in a medium tempo, a rhythmically simple tonal melody supported by harmonic blocked chords. Accordingly, the characteristics of the musical stimulus comply with Pike's (1974) context of examining jazz or tonal music, and align with the study's investigation of keyboard improvisers, as well as my background as a pianist. The idea for using an unfamiliar musical stimulus was adopted from Shockley (1980). Introducing an unfamiliar stimulus serves to yield responses that capture improvisers' initial feelings or associations, providing opportunities to observe how 'mental representations' of music are first formed. A musical transcription of the recording is provided in the following musical example (4.1).

[66] The inclusion of a harmony in the musical stimulus was deemed to be appropriate within the context of a private interview, for several reasons. First, the improvisers are not subjected to the same time pressure to learn the music quickly, as Gabriela Montero did for a larger audience. Second, as pianist Richard Grayson notes, the inclusion of a harmony often makes the learning process easier for the improviser, as the harmony would often be starting point for many ideas in their improvisation (see 30:50, 32:00, and 33:00 at https://www.youtube.com/watch?v=vlibSiESVI8). Third, Gabriela Montero has been seen to learn the harmony for the given musical stimuli (submitted by fans) in intimate performance contexts without being observed by a large audience (see https://www.youtube.com/watch?v=SUV-zwI5S5c and https://www.youtube.com/watch?v=4-wAeOimML0)

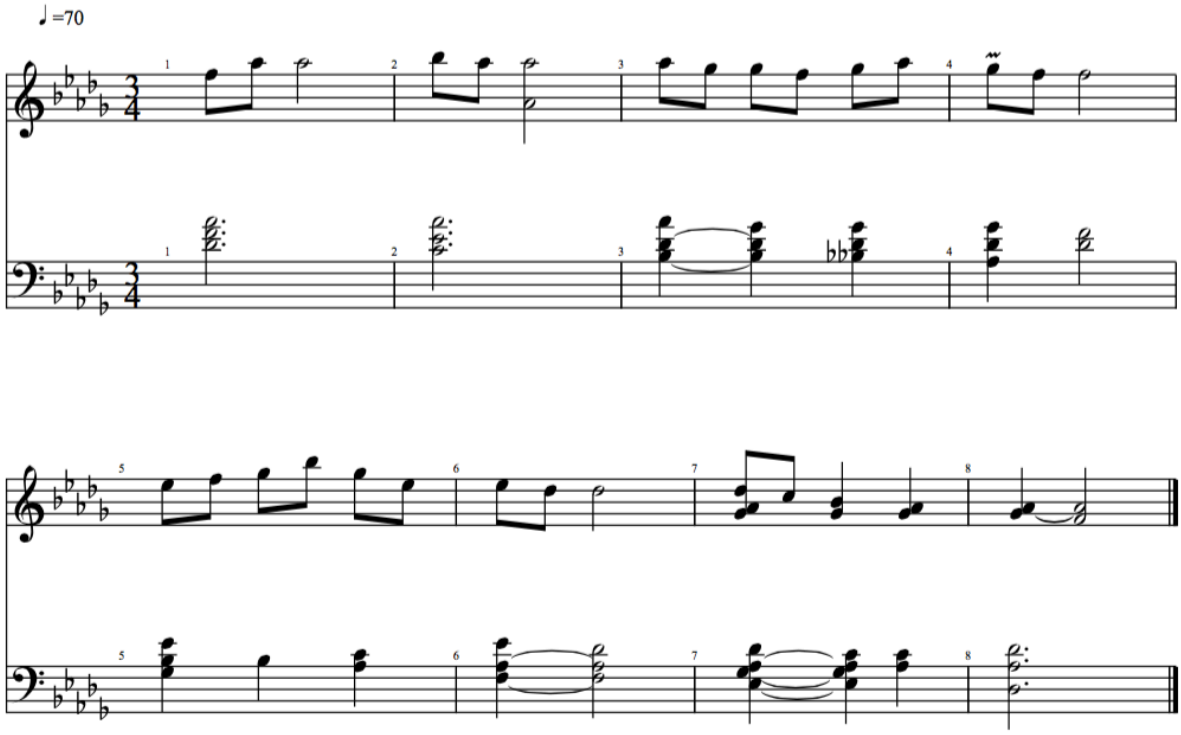


Figure 3.1: Musical transcription of the given musical stimulus.

Adopting aspects of the interview procedure from Norgaard's (2008) and Lehmann's (1997) studies, *no time restrictions* were imposed on the improvisers while they learned the given musical stimulus, and then performed an improvisation on it (p. 53). The improvisers were given as much time as they needed to familiarize themselves with the stimulus, including playing the melody and its harmonies over the piano, and listening to the piano recording as many times as needed. Although improvisers were encouraged to familiarize themselves with both the melody and the harmony, this was not a requirement. It was more important that participants felt ready and comfortable with the melody. Through the use of open-ended questions discussed in Section 4.2.1, all participants were encouraged to describe any multisensory associations they have experienced while they learned to play the musical stimulus, and retrospectively after they have performed.

Following the participants' performances, the use of music elicitation continued in a retrospective think-aloud protocol (Van den Haak et al., 2004), which involved participants hearing a playback of their improvised performances, and recounting their experiences (Allett, 2010). This method of elicitation, also known as a *stimulated recall* (Hodgson, 2008), is particularly well suited for examining decision-making processes, which fits my intention to

understand improvisers' ways of thinking. The act of music listening, as a form of a stimulated recall, is used in this study to explore the impact of improvisers' sound worlds "both as representational devices and as a means of generating new insights" (Daykin, 2008, p. 148). Adopting aspects of this technique from Norgaard (2008, p. 54), Burnard (1999, Appendix F, p. 5), and Nardone (1996: 73), participants were invited during the interviews to listen and comment on their experiences at specific points and in general. In contrast to Norgaard (2008), however, who had his participants describe only musical strategies during their improvisation process (p. 54), the improvisers in the present study were encouraged, through open-ended questions, to recount any meanings, narratives, representations, and metaphors that were constructed within the transient sound world of their improvisations (Daykin, 2008).

All music-making activities produced by the participants during the interviews, including their improvised performances, were video recorded with their permission. The musical improvisations were fully transcribed using traditional music notation to the best detail possible.

3.3.3 Graphic elicitation

Graphic elicitation is a visual method used for facilitating and examining the layers of experiences, of which cannot be expressed adequately by verbal descriptions alone (Gauntlett, 2007). In the present study, a variant of the *projective technique*, a visual method developed by Bagnoli (2009), was conducted towards the end of the interviews to capture other multimodal dimensions of improvisers' experiences. The procedure, being minimally structured, provides participants with the freedom to visually express their experiences of a phenomena, which includes their emotions, motives, and needs in any form of organisation (Allen, 1958). Integrating aspects of this tool usage from other studies, improvisers were asked to draw on paper: (1) their visual representations of the given musical stimulus (Shockley, 1980), and (2) their experiences of improvising with the stimulus, and then to explain what the drawings meant (Burnard, 1999). Essentially, the improvisers were asked to represent the music in a way that would help them to remember it. Thus, graphic ellicitation technique was used to promote improvisers' reflections on their perceptions as they explore their emotions, concepts, and thoughts through visual representations.

In keeping with the projective technique, participants were given complete freedom in their forms of visual expression. Following the replication logic of the multiple-case design, the (only) criterion, adopted from Barrett (1997) and Dunn (1997), was for participants to create a representation in which events of the musical stimulus and their improvisations are traceable. This procedure accordingly yielded two sets of drawings for each improviser. Its intent was to acquire visual representations of improvisers' first impressions of their reactions and of their performances, in order to investigate the relationships within and between the musical stimulus and the improvisations. In other words, the visual artifacts obtained from this method provided a further multimodal dimension for understanding a particular phenomenon of music improvisation within a specific context. The purpose of employing graphic elicitation, then, was to capture a wide-ranging view of improvisers' representations of music – and a powerful measure of their understanding of both the musical stimulus and their improvisations (Davidson and Scripp, 1988: 195).

3.3.4 Observation

To supplement the data obtained from interviews, and to also acquire descriptive information that links the contents of the musical and visual artifacts to the participants' actions, the study employed the method of observation. Among other advantages, observation as a method allows researchers to understand important contextual factors, and can provide a more objective measure of participants' behaviors (Johnson and Christensen, 2010). A variant method commonly used in phenomenology-based research is *participant observation*, which enables researchers to gather 'deep' information and perceptions (Lester, 1999). According to Spradley (1980), five types of participant observation can be identified: (a) *non-participatory*; (b) *passive participation*; (c) *moderate participation*; (d) *active participation*; and (e) *complete participation* (p. 58-62). During my interviews, I identified myself as a moderate participator and observer, where my priority was to maintain a balance as a musician with sufficient theoretical knowledge and as a non-improviser (DeWalt, K. M., DeWalt, B. R., & Wayland, C. B., 1998). Thus, the purpose of my field notes were aimed at capturing any non-verbal actions, particular conditions underlying each performance, or other contextual factors that appeared to influence the interviews and the investigation.

In addition to participant observation, I further employed a more targeted observation of improvisers' initial responses to the given musical stimulus. Using the videotaped interviews,

particular attention was given to the ways improvisers played through, and then eventually learned the entire melodic (and sometimes harmonic) sequences. The purpose of these targeted observations were guided by the study's research questions to understand the conceptual-based relationships that improvisers used to construct their 'mental representations'. Of interest, for instance, would be to observe how the participants prioritize the ways their ear training experience, their understanding of music theory, and their knowledge and associations to other similar sounding music, interacted and assisted in their learning of the musical stimulus. While acknowledging, as limitations, that such observational data will never account for a full description of the events (Peshkin, 1993), and that some of the participants' behaviours may never be clearly explained (Johnson and Christensen, 2010), observation is nevertheless one of the few methods that enables myself as a researcher to collect a first-hand account of the multimodal improvisation process.

To conclude, then, in this section I have introduced and argued for my choice of data collection methods, and taking care to cross-check each method with the phenomenologically informed multiple-case design, and the social constructivist underpinnings of the study. In the following, table 4.1 provides a summary of previous studies that have informed the methods of data collection for the present study.

Table 3.1: Summary of empirical studies informing present study's methodology

Researchers and Areas of work	Participants	Fieldwork	Use of interviews embedded with elicitation tools				Main theoretical perspectives adopted
			Music elicitation	Graphic elicitation	Musical Performance	Observation	
1. Shockley (1980): ***Improvisation and music memorisation***	**28**	**3 weeks**	√	√		√	**Gestalt theories: Murcell (1954), Lewin (1938)**
2. Nardone (1996): ***The experience of improvisation in music***	**3**	**3 days**	√			√	**Phenomenology: Husserl, Merleau-Ponty, Giorgi**
3. Burnard (1999): ***Childrens' lived experiences of improvising and composing***	**18**	**6 months**	√	√	√	√	**Phenomenology: Merleau-Ponty (1962), Van Manen, (1990)**
4. Barrett (2000): ***Interpreting a child's invented songs and graphic notations***	**1**	**N/A**	√	√	√	√	**Developmental theories in music: Kratus (1994), Hargreaves et al (1992)**
5. Custodero (2007) ***Origins and expertise in adult's and children's musical improvisations***	**4**	**3 days**	√		√	√	**Phenomenology: Clifton (1983)**
6. Chamblee (2008): ***Role of audience feedback in improvisation***	**2**	**1 day**	√		√	√	**Music memory theory: Snyder (2001)**
7. Norgaard (2008): ***Descriptions of improvisers' thinking***	**7**	**7 days**	√	√	√	√	**Improvisation models: Pressing (1988), Clarke, (1988), Kenny & Gellrich (2002)**
8. Berkowitz (2009): ***Comparing improvisation to speech***	**2**	**2 days**	√		√	√	**Linguistic theories: Patel (2007), McMullen (2004)**
9. Kingscott and Durrant (2010): ***Processes of jazz and organ improvisation***	**2**	**N/A**	√		√	√	**Phenomenology: Glendinning (2007)**

In summary, the methods of participant observation, and semi-structured interviews, which also incorporated music and graphic elicitation techniques, were used to obtain four different kinds of data sets.

3.4 Research design

Having presented the methods of data collection, this section turns to focus on the research design. In particular, the following subsections concentrate on the issues of sampling, the lessons taken from the pilot study, ethical considerations, and a proposed timeline for the remaining research phases.

3.4.1 Justification for two descriptive case studies

Having defended the study's multiple-case design in Section 3.2.2, I provide here the justifications for the use of two descriptive case studies, and my selection of one improviser for each case. Descriptive case studies, also known as "intense or focused case studies", "seek to reveal patterns and connections, in relation to theoretical constructions, in order to advance theory development" (Tobin, 2010: 288). Given the theoretically based research questions in this study, and its aim to deepen and clarify the multiparadigm understandings of improvisers' perceived mental representations, the choice of incorporating descriptive case studies into the research design was deemed appropriate. Most importantly, "descriptive case studies allow the reader to see the case through the theory-driven lens of the researche[r]", which is a crucial consideration for this study, due to the multiple theories of improvisation, mental representations, and meanings it draws from (*ibid*., 288). The use of descriptive case studies is also suitable for use within the IPA approach, which supports the use of theoretical frameworks or theory development (Smith et al., 2009: 163. 166).

Since my study sought to investigate *professional* improvisers, I adopted a purposive sampling strategy (Creswell, 2005), where participants are selected by the researcher to "learn or understand the central phenomenon" (*ibid.*, p. 204). In particular *criterion sampling*, which is a type of purposive sampling (Teddlie and Yu, 2007) targets certain individuals who fulfil specific criteria. In the context of a multiple-case study, the similarities of such individuals are used to replicate the conditions of each case in order to support (or invalidate) a study's propositions (Yin, 2014, p. 54). The considerations of my criteria was to recruit improvisers who: (1) were professional pianists, and (2) had the knowledge and expertise in improvising,

defined by at least ten years of performing experiences. Because the study is situated in the context of thematic improvisations, my criteria for stylistic considerations were sufficiently relaxed. Therefore, improvisers from jazz, classical, popular, or other similar genres were deemed acceptable.

In addition, the study's focus on professional pianists reflected the replication logic of the study's multiple-case design. The rationale for having a selection of pianists only was also attributed to (a) my area of expertise as a pianist, and (b) for practical reasons. Specifically, the recruitment of pianists, which include professionals who play the acoustic piano, electric keyboard, and pipe organs, eliminated the need for playing a 'backing track' or other forms of accompaniment, which was a necessary procedure for Norgaard (2008) to undertake for his non-pianist improvisers.

According to Yin, "the simplest multiple-case design would be the selection of two or more cases that are believed to be literal replications" (Yin, 2010, p. 59). In reviewing seven similar studies that have qualitatively examined and incorporated a theory on the experiences of improvisers, the number of participants found to be employed ranged between 3 and 28 people. Taking this number into consideration, and to satisfy the minimum requirements for the multiple-case design, this study employed two professional improvisers. Several reasons guided this choice. First, studying the phenomenon of improvisers' mental representations as they perform, points to a type of "real-time cas[e] [which] consist of investigating the phenomena as they are occurring" (Vardaman et al., 2010: 783). Such investigations, especially those that involve a "case study of creativity research" where "both the creator and the creation of the work", as well as the "processes of creation" are studied, leads to a "wealth of data" and "detailed analysis" that may be overwhelming to manage (Cohen, 2010: 81-84). As such, several studies that incorporated a real-time design, such as examining a pianist preparing for a performance (Miklaszewski, 1989), a jazz pianist memorise new music (Noice et al., 2008), or bodily movements in musical performance (Davidson, 2012) all involved using two or less cases, with each case being the performer or the performance. Second, the decision for using two cases in this study also reflects back on the study's phenomenological research strategy, which involves studying and working extensively with a small number of participants (Moustakas, 1994). Third, Smith et al. (2009) strongly advocate having a small

number of cases in an IPA study, "because the primary concern of IPA is with a detailed account of individual experience" (p. 51).

Smith et al. (2009) further emphasizes that "the issue is quality, not quantity, and given the complexity of most human phenomena, IPA studies usually benefit from a concentrated focus on a small number of cases" (p. 51). Additionally, Yin (2014) forewarns that, "selecting such cases requires prior knowledge of the outcomes…focusing on how and why the exemplary outcomes might have occurred and hoping for literal (or direct) replications of these conditions from case to case" (p. 59). Heeding Yin's advice, then, the study employed a selection of two pianists who specialise performing in different musical styles[67], so as to acquire a mix of cases that can predict either similar or contrasting results, both for "anticipatable reasons" (Yin, 2014: 54). The decision to not perform the sample selection based on expertise in different musical genres reflects the crossover and fusion of musical styles many contemporary musicians nowadays perform in.

To close this subsection, I have presented and justified my choice for adopting two descriptive case studies into the multiple-case research design, and my reasons for selecting two professional pianists. The selection of participants in the pilot study was informed by previous studies, and was also guided by the theoretical and replication requirements of the multiple-case study.

3.4.2 Pilot study

A pilot study was conducted to test the interview questions and the elicitation tools, and to acquire confidence in interviewing skills (Kvale, 1996). An email detailing the proposal of the present study and interview procedures was sent out to potential improvisers in July 2013, whose contacts were acquired through their professional websites. A musician, named Ron Drotos, was the first person who had responded to the email (e.g. within a week) and was thus recruited into the pilot study. Ron, who is a professional pianist based in New York, United States, has had over twenty-five years of improvising experience, having performed in venues including Carnegie Hall and Broadway. Furthermore, Ron has also released several commercial recordings, and teaches jazz and classical improvisation.

[67] One pianist, Stuart, specializes in several genres including funk, rock, pop, and blues, while the other pianist, Ron, specializes in jazz, classical, Broadway, and pop, among others.

The choice of the interview lengths and setting were informed by phenomenological studies on improvisers' experiences by Nardone (1996), and Custodero (2007), as well as more cognitive based studies by Norgaard (2008), Berkowitz (2010), and Chamblee (2008). All of these studies focused on the improvisation performance as the unit of analysis, and the interview questions that were asked revolved around the improvisers' experiences and processes of the particular performance. In all of these studies, each interview was conducted in the participants' homes and completed within one day. The number of interviews and days required for each study corresponded to the number of improvised performances that were produced. For example, Nardone's (1996) interviews took place on three separate days for three professional improvisers. Custodero's (2007) interviews were carried over two separate weekends for two improvisation performances. One interview involved two adult composers improvising a duet, while the other interview involved two children improvising together. Norgaard's (2008) stimulated improvisation sessions and interviews took place over seven days with seven jazz improvisers' performances. Chamblee (2008) compared the processes of improvisation of an organist's recorded performance from an international organ improvisation competition, and conducted a one-day interview with a jazz vocal improviser in a church gospel choir after her musical performance during a service. Finally, Berkowitz (2010) interviewed pianists Robert Levin and Malcolm Bilson on two separate days in different cities.

Thus, the main interview took place in one day and was conducted in the participant's home. The in-depth semi-structured interview lasted between four to six hours. With the participant's consent, the interview was videotaped and transcribed. In keeping with the quasi-naturalistic context of the pilot study, the one-to-one interview was conducted at venue and on instruments chosen by the participant. Being a non-UK participant, his improvisation performance was digitally transmitted live using *Skype,* a free video conferencing software. The entire interview, including the improvisation performance, was recorded using *Callnote*, a *Skype*-compatible free video recording software. Two lessons were learnt from the first pilot interview, of which modifications were made for the second interview:

Box 3.1: Lessons learnt from the pilot study

- Lesson one: To identify an ideal musical stimulus that possessed optimal dimensions of length, key, style, and tempo for participant to learn and improvise on.
- Lesson two: Readjusting order in which to conduct particular elicitation techniques. For instance, for the interview with the second improviser, the graphic elicitation technique was moved to the end of the interview as they were found to distract the pilot study participant from his narrative.

The semi-structured interview conducted in the present study yielded four different data sets. First, the recorded semi-structured interview produced the verbal data from improviser's reflections and descriptions of his performing experiences, and his explanations of the drawings he created. The video-recorded interview also provided observational data of the improviser's non-verbal actions. This included any musical demonstrations or notes that were sung or played on the keyboard, such as making a reference to another song, while he was learning the given musical stimulus and explaining his thought processes. The third type of data was the audio recording of improvisation that was performed by the participant. Finally, the improviser's drawings provided a fourth type of data, which was obtained through the graphic elicitation tool that was employed during the interview. The improviser produced a set of two drawings from graphic elicitation: a drawing of the given musical stimulus, and another drawing of his improvised performance. The following chart, then, summarises the amount of each data type that was collected, as well as the location and date of the interview.

Table 3.2: Summary of time, location, and data collected from pilot interview

Qualitative methodology ⬇	
Interpretative phenomenological approach (Smith et al., 2009) ⬇	
Phenomenologically informed multiple case design ⬇	
Two in-depth case studies, bounded by two improvisers' performances ⬇	
Methods	**Data sets**
Semi-structured interview (*Each conducted in one day)*	Recording and transcriptions of verbal data *August 16, 2013 – 5 hours (New York, USA via Skype)*
Embedded elicitation tools in the interviews	
Music elicitation	Transcriptions & recordings of improvisation (c. 5 min) *Total: approximately 5 pages of transcribed music*
Graphic elicitation	Participant's drawings *Total: four drawings; two drawings of the given stimulus and of the improvisation*
Observation	Notes of participant's actions, woven into the verbal accounts

A considerable amount of time was devoted to constructing a set of analysis procedures that is suitable for each data set: (1) verbal data; (2) observational data; (3) improvised performances; and (4) participant's drawings. In particular, the data from the pilot study required an analytical approach that can showcase multiple in-depth analyses from *four types of data* that revolve around a *musical performance*. As stated in Section 3.2.1, the present study had adopted an *interpretative phenomenological analysis* (IPA) approach devised by Smith et al. (2009) to examine three in-depth cases of improviser's constructed mental representations. The context, or "unit of analysis" (Yin, 2014, p. 30) of each case is bounded by the improvisation, and an improviser's perceived experiences of that particular performance. While Smith et al. have provided detailed steps for implementing an IPA analysis for each case, their guideline dealt only with verbal and observational data. However, Smith et al. (2009) encourage future studies to "open up new avenues of design and data collection for IPA", and to use "various experiential and mindful methods to…prompt participants to provide a different level of recall – a 're-imagining or 're-living'…of their experiences" (p. 204).

However, most studies that have specifically adopted the IPA approach devised by Smith et al. (2009) have only presented the analyses of participants' verbal accounts and written diaries (e.g. rivers of musical experience). These IPA studies include the examination of improvisers'

musical identities (Sansom, 2007); understanding cancer patients' experiences in an improvisation program (Pothoulaki et al., 2012), and exploring the musical lives of mature age keyboardists using an IPA and mixed methods research design (Taylor, 2014). Thus, I consulted studies outside of IPA that have also employed an interpretative analysis of musical performances, drawings, verbal, and observational data. In particular, the general approaches from two interpretative phenomenologically informed studies by Barrett (2000) and Custodero (2007) were adopted to analyse the data from the pilot study. Barrett (2000) showed a way to present the transcribed performances of a child's instant musical compositions, and the child's graphic notations of the performances using a narrative of musical descriptions. Meanwhile, Custodero (2007) presented a narrative that wove the improviser's verbal accounts together with musical descriptions of the improvisations and observational data. However, neither Barrett nor Custodero provided the precise analytical procedures required for each of the data sets prior to the synthesis of a findings narrative. As such, it was also necessary to find four analysis procedures that are specifically designed to examine verbal and observational data, musical transcriptions, and participants' drawings. Furthermore, each analysis procedure must be interpretatively and phenomenologically informed in order to meet the requirements for an IPA study (Smith et al. 2009). The examination of verbal, observational, and musical data also involved creating spoken and musical transcripts from the recorded interview.

The verbal data from the recorded interview was transcribed using free transcription software called *InqScribe.* This simple software offered a textbox with an audio player next to it, which provided an easy access to play, pause, and fast forward or backwards an audio file while transcribing the text. The speed of the audio recording could also be altered, which proved to be a useful function for clarifying the words of the participants that were spoken rapidly. Together, the total interview length of the pilot cases was approximately 330 minutes, which included one to two hours of improviser's performances on other given musical stimuli. However, the present study focused on the improviser's performances based on one particular song, called 'Answer me'. Thus, only the verbal data that pertained to the improvisation on this song was transcribed, as "it is pointless to transcribe information which will not be analysed" (Smith et al. 2009: 74). Approximately two to three hours was transcribed, comprising 6000 to 7000 words. Relevant data concerning the improviser's musical backgrounds were also included, as well as observations of the improviser's non-verbal

actions that occurred during spoken dialogue, such as gestures and musical demonstrations. These "features of social interactions" were considered to be important data, especially since "transcription is itself a form of interpretative activity" (*ibid*., p. 74). Once all of the required verbal and observational data was transcribed, the transcript was analysed using the IPA guidelines by Smith et al. (2009). The precise analytical procedures of the verbal and observational data are further discussed in Section 3.5.1.

The musical analysis of improvisation was largely informed by a method developed by Ferrara (1984). Ferrara presented a method that combined traditional musical analysis and phenomenology to examine three levels of meanings that emerge from *listening* to the performance. These three levels of meanings comprise (1) syntactical meanings; (2) semantic meanings; and (3) ontological meanings. Syntactical meanings refer to the identification of structures and elements using traditional forms of musical analysis, such as a chord progression and the motifs that are used. The semantic and ontological meanings refer to the many "important dimensions of meanings" that "lie outside of the…musical syntax" (Ferrara, 1984: 360), such as an improviser's extra-musical associations, and the performance context. According to Ferrara, the amount listening required for each level of analysis depends on the particular performance and the analyst. He provides an example where his analysis presents in narrative form the different types of syntactical, semantic, and ontological meanings of a performance. In particular, Ferrara's comprehensive analysis of the syntactical level combined three reflections that described in detail the musical events of the performance in ten Sections. At the same time, Ferrara has pointed out that as the analyst increases the amount of listening, the "syntactical, semantic, and ontological levels of meanings may stand out in a conceptual, contrapuntal design of meaning-dimensions" (Ferrara, 1984: 360). As such, studies that have employed Ferrara's method have presented the three levels of analysis of one improvisation as *separate* narratives, or as one *combined* narrative. For example, Arnason (2002) wove all three levels of meanings into an "improvisation narrative" that comprised a "non-conventional textual representation" of a group improvisation from a therapy session (p. 6). Her semantic meanings included her "thoughts, feelings, or reactions…imagery or metaphors" that were evoked from listening to the music (p. 6). Arnason (2002) described her analysis as a "type of interpretive musical description" that "is an exploration in writing musically" (p. 7), drawing from Wolcott (1990, 1995) and Richardson (1994) who use narrative inquiry to understand peoples' experiences. Similarly,

Abhonen and Houde (2009) adapted Ferrara's method into the analysis of two group improvisations by six participants. Participants were asked to listen and reflect on their recorded performances using Ferrara's method of listening and noting syntactical, semantic, and ontological meanings. The participants' reflections were then underwent grounded theory analysis, and their findings presented two descriptive categories of the participants' experiences in a narrative style. On the other hand, Amir (1990) presented three separate narratives of the syntactical, semantic, and ontological meanings of a patient's improvised song from two music therapy sessions, weaving in the patient's background and her own imagery of the song. These three studies show how Ferrara's method combines traditional musical analysis with phenomenological interpretation to identify the referential meanings associated with the improvisations. The present study, then, adopted Arnason's (2002) approach for presenting an improvisation in a combined narrative form, where all three levels of the syntactical, semantic, and ontological meanings are woven together into an interpretative musical description.

Although Ferrara's analysis approach was based on *listening* to the improvisation, it was decided that the entire performance should also be musically transcribed. Ferrara (1984) himself had provided a narrative analysis that included musical transcriptions of short rhythmic excerpts from a recording (p. 365-367). Musical transcriptions provide a 'snapshot' of what was played (Burnard, 1999: 330), which offer an efficient means of data management. As such, several improvisations can easily be compared together using these 'snapshots', as opposed to listening only from recordings. Other studies on musical improvisation that has included the analysis of transcribed improvised performances or instant compositions include Burnard (1999), Barrett (2000), Norgaard (2008), Chamblee (2008), and Berkowitz (2009). Furthermore, a transcription allows for an in-depth traditional musical analysis, which can draw out relationships between the musical elements that were played. For instance, Arnason (2002) had transcribed parts of the improvised performances, weaving them into a narrative description of the performance to illustrate how the syntactical meanings emerge (p. 7-11). As her study shows, a transcription can also visually present the syntactical meanings of the performance, such as showing the location of a specific motif in relation to other motifs on a page.

Thus, the recording of improviser's performance was transcribed using a simple iPad software app called *iwritemusic*. This software was chosen among others as it offered a free trial, and provided many useful tools for creating and managing the transcribed musical data. Among other features, this software provided a large vocabulary of symbols from the western music notation system that enables a relatively detailed transcription of the performances. Additionally, it offered a function where the musical transcription could be played back, which proved to be very useful for matching the accuracy of the notated pitches and rhythm with the recordings of the actual performances. The transcription process using *iwritemusic* entailed multiple intensive listening to small Sections of the improvisation, with each Section comprising three to five seconds of music. Every five seconds of recorded music required at least five minutes of multiple listening and the transcription of both the right and left hand parts on the keyboard, which includes all of the rhythmic variations, note embellishment, and chord inversions used in the accompaniment. Once all of the notes were completed and verified by the playback function (and by playing through the transcription on a piano), the same listening process was repeated to add in the details for the tempo variations, pauses, dynamics, and articulation. Once the transcription for an entire improvisation was completed, it could be exported from the *iwritemusic* software as a PDF file. The PDF files of the musical transcriptions, and the recordings of the performances were then sent to the improviser for verification and feedback. A musical transcription of the given musical stimulus – the song 'Answer me' as played by pianist George Shearing – was also created with the same process. The precise procedures for the phenomenological musical analyses of the improvisation are discussed further in Section 3.5.2.

To analyse the improviser's drawings from the pilot study, a phenomenological approach known as the *MSC method* (*morphological, structural, conceptual)* was chosen. Developed by Elkoshi (2004) to interpret children's invented notation, the MSC method offered a multi-dimensional procedure that involved analyzing the ascribed meanings, spacing, size differentiation, and direction of notational symbols. Having reviewed various studies including Barrett (1997) and Davidson and Scripp (1988), Elkoshi had developed the method following Hargreaves' (1992) suggestion of a need for alternative methodological approaches for examining children's notations. By considering the four dimensions of meaning, spacing, size, and direction in a graphic notation, Elkoshi (2004) aimed to "correct methodological shortcomings, which seemed to appear in some studies" (p. 63). Most importantly, Elkoshi's

(2004) objective was to investigate graphic notations "not from a cognitive-developmental but rather from a *phenomenological* approach" (p. 63, my italics). Thus, Elkoshi's phenomenologically informed MSC method was considered to be the most suitable for analyzing improviser's drawings, as it aligned with the IPA approach adopted in the present study.

The letters "MSC" in Elkoshi's method are acronyms that correspond to three phases of analysis for a drawing: (1) morphological, (2) structural, and (3) conceptual. A morphological analysis describes visual features of the notated symbols, such as the use of icons, geometric shapes, height, width, lengths, and different colours. The structural analysis examines the interrelationships between individual notated symbols, such as how they are positioned, grouped, repeated, and their proportions to each other. A conceptual analysis focuses on defining the meanings ascribed to the notations, such as the musical contents that it represents, which can be supported by a participant's explanations of their drawing. The conceptual analysis can be classified further into several categories, which include (1) *association,* (2) *pictogram,* (3) *formal response,* and (4) *growth. Association* refers to elements of a drawing that convey metaphors or narratives. A *pictogram* describes references in the drawing to the musical instrument that was used in the performance. The *formal response* denotes the representation of chronological musical events of the performance. Finally, *growth* refers to the representation of musical groupings in the performance, such as depicting subunits of phrases. Hence, the MSC method addressed cases where a symbol can represent more than one sound, and when the direction of notation does not follow the writing of a language (Bamberger, 1991). It also considered instances where long and short sounds are not represented by large and small symbols (Upitis, 1990), and the issue of interpreting space proportions that are not related to time intervals of the music (Arnheim, 1974). The analytical procedures for analyzing the improviser's drawings using the MSC method are further discussed in Section 3.5.3.

Hence, the interview, improvisation, drawings, and observation notes from the pilot study were first analysed separately using a phenomenological approach suitable for each data set. In particular, the analysis of the verbal data (interview) followed the steps outlined by Smith et al. (2009), which resulted in three overarching themes: (1) mental representations of desired performance goals, (2) mental representations of production aspects, and (3) mental

representation of the actual performance. To answer the research questions, each theme underwent a deeper step of IPA "micro-textual analysis" (Smith et al, 2009: 106), which involved a close reading of a "particularly resonant passage and so move to a deeper, more detailed, reading of the part" (p. 104). For the microanalysis of each theme, Leman's (2010) framework of embodied semantics in mental representations was used to synthesize the analyses of the other data sets. According to Smith et al. (2009), IPA can be used creatively to introduce an external theory. The authors presented an example where an IPA study by Smith et al. (1999) employed a theoretical framework by George Mead (1934) to conduct a cross-case analysis of women's experiences of motherhood (Smith, 2009: 166). More specifically, then, Leman's (2010) framework, which was introduced earlier in Section 2.1.2, provided a way to *synthesize the relationships between different sets of data analyses*. Following the microanalyses for each theme, the synthesized analyses of all the data sets were then presented as findings in a narrative form. The precise procedures for the IPA microanalyses of the super-ordinate themes are discussed further in Section 3.5.4.

Following the extensive analysis of the pilot interview, the findings from the pilot study turned out to be so interesting that it was decided that these interviews would be incorporated into the main study as the first (out of two) descriptive cases. According to Yin (2014), a pilot case study may become the first of a multiple case study (p. 49). Yin (2009) further points out that the "pilot case study can be so important that more resources may be devoted to this phase of the research than to the collection of data from any of the actual cases" (p. 92). Moreover, Teijlingen and Hundley (2001) assert that the incorporation of the pilot into the main study is often practiced in qualitative research, due to its more progressive nature in data collection and analysis (p. 3). The authors also point out Holloway's (1997) argument that pilot studies are not necessary in qualitative approaches. Additionally, Smith et al. (2009) did not specify any requirements of a pilot interview for an IPA study, although they have provided recommendations for practice interviews with colleagues (p. 75-78). Indeed, most of the IPA studies on musical improvisation and music learning, including Sansom (2007), Clark et al. (2007), Taylor (2014), and Pothoulaki (2012) have not reported the lessons learnt from a pilot study, nor do the authors make clear whether pilot studies were undertaken. The use of pilot interviews was also not frequently encountered in studies that examined improvisers' performing experiences. Norgaard (2008) provides an example where the findings from a pilot interview with a jazz improviser were incorporated into the main study of six other jazz

improvisers, as few modifications were made following the pilot study (p. 49).

More importantly, the data from the pilot interview in the present study offered a rich set of data from different perspectives, which required undertaking an extensive analysis for each case. According to Smith et al. (2009), conducting a proper in-depth analysis of a few cases requires several months (p. 55). In the present study, the first-order, second-order analysis, and microanalysis of all four data sets from the pilot interview required at least two months, which does not include the writing up process of the findings into a narrative.

3.4.3 Ethical considerations

Throughout the stages from the initial contact with the improvisers to their follow up interviews, the procedures of my research design adhered to the Revised Ethical Guidelines for Educational Research (BERA, 2011). The research responsibility and priority was to uphold the trust of the participants and to respect their rights.

To protect the participants' privacy, each improviser was provided with a consent form to sign on, and request for their voluntary consent, with one copy for them to keep. The consent form provided a detailed proposal of the study, the improvisers' contributions, what to expect during the interviews, and how their information will be used. In the consent form, the participants were also assured that their anonymity and confidentiality will be protected, and of their rights to withdraw their information and participation at any time. Additionally, Smith et al. (2009) recommends a strategy for providing a "time-limited right to withdraw (up to one month after the interview)", so as to make clear that withdrawing from the study would not be possible when the data analysis has begun, or publication has taken place (p. 54). As such, I took care to explain explicitly in the consent form that participants were given at least three weeks to review the interview and musical transcripts, and thereafter it will be assumed that they agree with the transcriptions as written and presented.

At the same time, performing an improvisation during an in-depth, one-to-one interview with a researcher results in a highly intensive and personal experience for the participants (Stake, 1995). To help my participants feel more at ease, all of the interviews were conducted in the homes of the participants, in settings that are familiar and comfortable to them in order to emulate a more naturalistic context. Sensitive information disclosed by the participants

remained strictly confidential. As a 'stranger', I also needed to be prepared to accept that my participants may be unwilling to perform, or feel uneasy about being recorded in any manner. However, both participants were very cooperative, even eager, to perform and share their experiences. Although one improviser had expressed a slight hesitation towards listening to a recording of his performance for the stimulated recall elicitation, his hesitation ceased as he started to narrate his feelings of the music during the playback.

3.5 Interpretative phenomenological analysis procedures

This section presents the set of analytical procedures that were employed to examine four types of data that were collected for each case. As argued for in Section 3.4.2, these procedures were chosen based on the incorporation of interpretative and phenomenological aspects in their analytical approaches, in order to align with the requirements for an IPA study (Smith et al., 2009). The following subsections, then, show how each of the data sets (verbal data, improvisations, drawings, observation notes) were analysed, and how these analyses were brought together into a 'meta-interpretation' to answer the research questions.

3.5.1 Analysis of verbal and observational data sets

The interpretative phenomenological analysis of the verbal data followed a detailed guideline outlined by Smith et al. (2009) that involved four stages. In the first stage, the transcripts of the verbal and observational data was read over several times, during which vivid recollections of the interview and initial observations were written down as memos. During this stage, steps were also taken to sample the large amount of the collected data in order to focus the analysis on "moments which are most informative" (Kanellopoulos, 2000: 75). Termed by (Kanellopoulos, 2000) as a strategy of "focusing on information-rich occurrences" (p. 75), this study focused on both improvisers' performances on the same musical stimulus, out of several improvisations that were produced[68]. This strategy was adopted to fulfil the replication criteria of the multiple-case design (Yin, 2014), and to reduce the already large number of unknown variables from studying two complex phenomena[69], which is critical for a descriptive case study where the aim is to advance theory development (Tobin, 2010). In addition, the study's research questions drove the unit of analysis. In order to examine the

[68] In addition to performing improvisations based on the given musical stimulus, both improvisers also performed several other improvisations using their own musical stimuli.
[69] By this I mean (1) the improvisation process, and (2) the improvisers' mental representations.

improvisers' mental representations through instances of their meaning constructions, the study's unit of analysis is similar to that of (Kanellopoulos, 2000), who examined children's understanding of their improvising experiences. In particular, the unit of analysis is that of

> "'Conversational occurrence', and particular musical episodes, 'events' which illuminate and are illuminated by the perceptions expressed in that conversational occurrence. We are here dealing with issues that emerge out of particular interactions (musical or verbal)" (Kanellopoulos, 2000: 78)

The second stage of the IPA textual analysis for each case underwent a process of "initial noting" (*ibid*., p. 83), which involved writing down three layers of exploratory notes. The first layer of exploratory notes is descriptive, where the literal language of the participants is noted. A second layer focuses on the linguistic aspects, in particular examining how specific words were said and used by the participants. The first two layers are then combined to form a third conceptual layer, which is the researcher's interpretation of what the participants have said. In the following, the analysis of a quote from Stuart[70], which includes observation notes (*in italics*), is presented as an example.

Box 3.2 Example of observation notes from Stuart's interview

So if that was an emotion, then....(starts playing the melody and harmony together from the beginning)…well, first of all, just the harmony of those chords, they sound quite - not too...(plays the second motif over a flat iv and pauses over the chord) menacing, probably not too deep really; quite pleasant (gestures in a wave).

For Stuart's quote, the descriptive comments included "chords are distinct from harmony"; linguistic comments were "uses 'not too' and 'quite' twice to emphasize on a light and pleasant mood"; while the conceptual comments were "individual chords convey little emotions, it's about how they are combined, progress, and move, hence the use of the word 'harmony'."

For the third stage of analysis, 'emergent themes' (*ibid*., p. 91) were developed from the exploratory comments. This step involved a local-level chunking of the initial notes, which necessarily results in "breaking up the narrative flow of the interview" (*ibid*., p. 92). The size of each chunk depended on the content and length of the initial notes written for every quote. To develop an emergent theme from a chunk of initial notes, the three layers of exploratory comments were summarised by a short phrase. These emergent themes were developed

[70] Stuart is the second improviser in this study, whose findings are presented in chapter 4.

chronologically according to the order of appearance of the exploratory notes, and their corresponding quotes. For example, in Stuart's case, a total of 27 emergent themes were developed from the exploratory comments[71].

Lastly, the fourth stage of the textual analysis for each case involved developing 'super-ordinate themes' (*ibid.*, p. 96-97) by looking for patterns and connections across the chronology of emergent themes. Smith et al. (2009) recommended several strategies for developing super-ordinate themes, which include the use of abstraction, subsumption, contextualization, and numeration (p. 96-98)[72]. For Stuart's case, four super-ordinate themes were ultimately finalized through the strategies of abstraction and contextualization. The first super-ordinate theme, *learning phase*, was developed from several emergent themes that included (1) developing approximation of music and (2) learning structure. Next, the second super-ordinate theme, *ideation phase*, was developed from the emergent themes of (1) establishing conceptual structures and (2) forming associations to musical features. Meanwhile, the third super-ordinate theme, *improvisation phase*, was developed from emergent themes such as (1) establishing flow – attending to physical and mental aspects, (2) multitasking, and (3) monitoring from different perspectives. The fourth super-ordinate theme, *reflection phase*, was developed from emergent themes including (1) identifying structural relationships and (2) distillation and synthesis of ideas. Each of the four super-ordinate themes then underwent a microanalysis, which incorporated the analyses of other data sets (improvisation performance, drawings, and observations) to triangulate and add depth to the textual analysis of the verbal data. The microanalysis procedure for the super-ordinate themes is presented in Section 3.5.5.

[71] For instance, the quote example that was provided in the last paragraph was assigned the emergent theme "hierarchy, combination, and roles of different sounds." Examples of other recurring emergent themes included: (1) Establishing conceptual structures and features; (2) Learning structure; (3) Approximation of music; (4) Establishing flow – attending to physical and mental aspects; (5) Multitasking; (6) Monitoring from multiple perspectives; (7) Distillation and synthesis of ideas, and (8) Identifying structural relationships.

[72] In particular, abstraction refers to the identification of patterns, while subsumption refers to an emergent theme that acquires the status of a super-ordinate theme by bringing the other emergent themes together. Contextualization examines the chronological order in which these emergent themes had developed, while numeration focuses on the number of times each emergent theme has recurred. Smith et al. has pointed out that these strategies can be used together to organise the emergent themes, which was an approach that was adopted in the present study. For example, the numeration strategy helped to identify the repetition of emergent themes in Stuart's case – 'Establishing flow' had recurred four times, while 'Multitasking and monitoring' had recurred five times.

3.5.2 Analysis of the musical stimulus: four motives

In order to analyse how the improvisers have used the musical stimulus, it was necessary to perform a musical analysis of the musical stimulus in order to trace similar musical elements that feature in the improvisation performances. As such, a musical analysis of the musical stimulus using Ferrara's (1984) phenomenological approach is provided in this section. As the analysis below shows, the melodic theme of the musical stimulus comprises a lyrical melody in the key of D-flat major that is supported by a 'lament bass' – a linear, descending stepwise chordal accompaniment (indicated by blue arrows). Set in a simple triple meter at an *adagio* (slow and stately) tempo, the tender theme, which is played softly on the piano with a sustained pedal, unfolds through four melodic motifs.

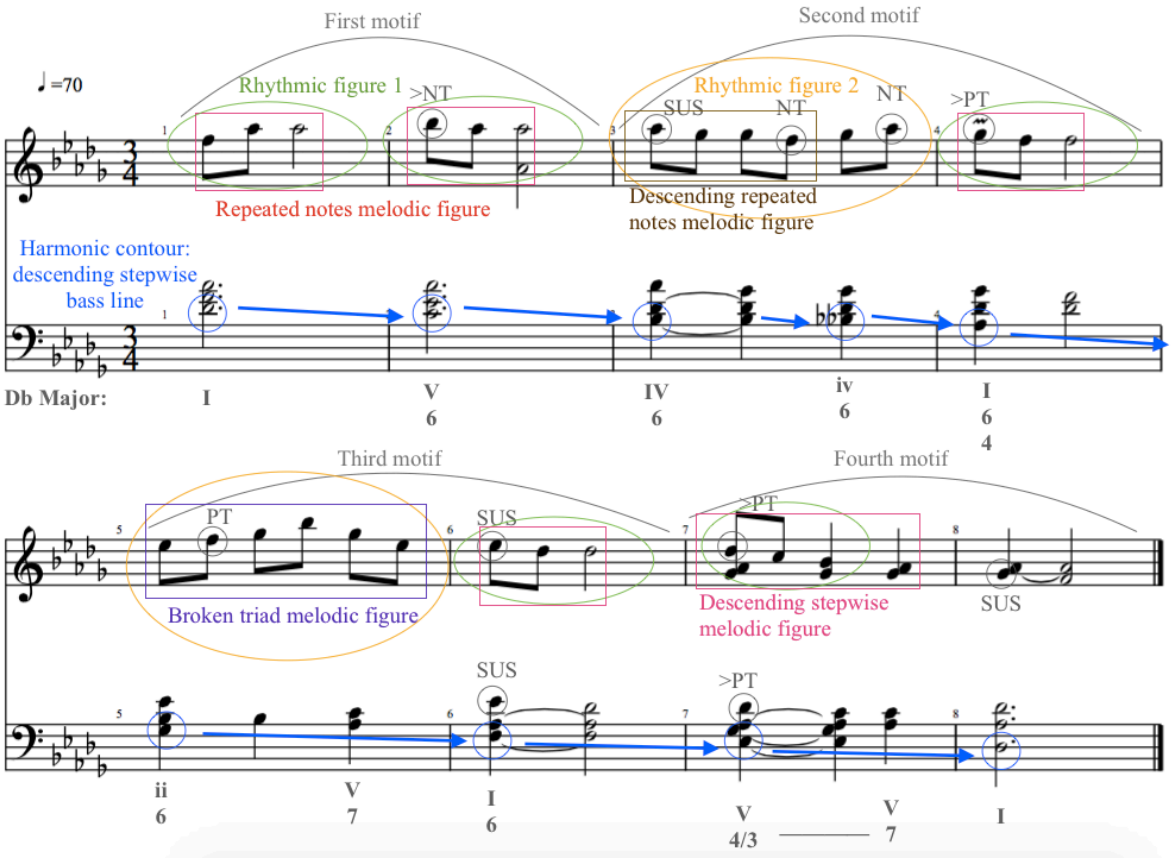


Figure 3.2: Musical transcription and analysis of the given musical stimulus.

In the following, a musicological description of the four motifs is provided.

First motif (mm. 1-2): This motif opens with an ascending repeated note figure in a high register (shown in a red box), driven by a short-short-long rhythmic pattern (circled in green) that is echoed by a similar descending figure. A melodic tension in m. 2 is heightened by the

b-flat suspension over a V-6 chord, which swiftly resolves to a-flat that is repeated then sustained, conveying a call of nostalgia.

Second motif (mm. 3-4): This motif introduces a descending repeated melodic figure (shown in a brown box), which then melodically ascends like a questioning phrase, before closing with the melodic and rhythmic elements from the first motif. Carried forth by a longer rhythmic sequence of six eighth notes (circled in orange), the melody takes a subtle melancholic turn when the harmony progresses to a iv chord, borrowed from the parallel minor key, which resolves temporarily to a I-6/4 chord in m. 4.

Third motif (mm. 5-6): Borrowing the rhythmic and melodic elements from the first and second motifs, the third motif features an arc-like melodic figure in m. 5, which outlines the triad structure of the minor ii chord (shown in a purple box). The reappearance of the melodic figure from the first motif, along with the harmonic resolution to the I-6 chord in m. 6, restores the opening nostalgic character, conveying a sense of hope.

Fourth motif (mm. 7-8): The last motif centers on a descending stepwise melodic figure (shown in a pink box), then settles with a repeated and sustained note. The return of the harmonic progression to the I chord in root position in m. 8, since its first appearance in m. 1, indicates the ending of the melodic theme, conveying a sense of resolution.

As the musical analysis has shown, the melodic motifs of the musical stimulus are built from at least seven short melodic and rhythmic figures. Many of these figures are closely related to each other and are repeated several times throughout the music (e.g. repeated notes figure, in red). These rhythmic and melodic figures in the musical stimulus become an important basis for tracing significant developments in the improvisers' performances in chapters four and five.

3.5.3 Analysis of improvisation performance data sets

To perform a traditional music analysis of the transcribed performances, I employed *Preview*, a PDF viewer and editor that provided a wide range of editing tools including creating geometric shapes, lines, arrows, colour shading, and text addition. These editing tools were used to carry out a detailed musical analysis of the transcribed improvisations, which constituted the syntactical level of analysis in Ferrara's (1984) method, which was introduced

in Section 3.4.2. In particular, different colours of geometric shapes were used to highlight the appearances of old and new musical motifs; the arrows were used to show the contour of the bass lines; and the addition of text provided the roman numerals for the harmonic analysis.

Using these tools, the process of a musical analysis for each improvisation involved several steps. I began with a harmonic analysis of both the right and left hands of the piano parts, in order to establish the tonal centre of the music and to keep track of any modulations into new keys. Next, I analysed the contents of the improvised melody and the accompaniment separately. In the improvised melody, I looked for components that were strongly related to the given stimulus, then analysed how they were different from the original components. The same process was repeated for the improvised accompaniment. In particular, I categorized and separated the reappearances of the original material into rhythmic and melodic components. The parts of an improvisation that did not match the original stimulus were categorized as new material that the improviser has created[73].

To write up this musical analysis, I followed Ferrara's (1984) procedure of grouping the syntactical analysis into musical Sections, and adopted Arnason's (2002) approach of presenting an interpretative musical description of the improvisation in narrative form[74]. The interpretative musical descriptions included a semantic analysis of the expressive elements in an improvisation, such as the changes in dynamics, articulation, phrasing, and the use of rubato and pauses. When the phenomenological musical analyses of the improvisations were completed, they were then used to carry out a microanalysis of each of the super-ordinate themes, which is discussed further in Section 3.5.5.

[73] For example, in Stuart's improvisation, 6 new melodic figures and 5 new rhythmic figures were identified. On the other hand, the components of the first motif from the original stimulus frequently appeared; its rhythmic figure was quoted 38 times, while a melodic figure was quoted 17 times. A melodic figure from the third motif was also quoted 6 times. This system allowed me to pin down *parts* of the original material, such as identifying a rhythmic figure from the first motif in the accompaniment, or melodic references to specific pitches from the third motif.

[74] For example, I grouped the musical descriptions for Stuart's improvisation into twelve Sections. The musical analysis for this improvisation had revealed the musical structure of a sonata form (A-b-A' + Coda) woven with themes and variations. Each of the A and A' Sections comprised three variations of the original stimulus in a major key, while the B Section comprised five shorter variations in a minor key. These eleven variations are followed by a coda that concludes the improvisation. Stuart's explanations and his drawing depicting his performance, which featured twelve components, also helped to verify the musical structure of his improvisation. As such, the musical descriptions for each Section were determined by the contents in each variation.

3.5.4 Analysis of the improvisers' drawings data sets

In the present study, the set of two drawings by each improviser – a drawing of the given stimulus, and of the improvisation – underwent MSC analysis (Elkoshi, 2004), which was introduced in Section 3.4.2. Three steps were involved for analysing each drawing: 1) Describing the components of the drawing (morphological analysis), 2) Examining grouping strategies and the relationship between components (structural analysis), and 3) Defining and interpreting the contents of the drawing (conceptual analysis). The analyses in each phase are supported by the improviser's explanations.

For example, a morphological analysis of Stuart's musical stimulus drawing identified four geometric shapes (three squares and one rectangle), Roman numeral letters, and wavy lines. These elements then underwent a structural analysis that identified a left-to-right progression of the notated shapes, and the symmetrical positioning of the small rectangle between two large squares.

For the conceptual analysis, Stuart's explanations were used to define the square as representing a "standard I-IV-V chord progression"; the rectangle as "a minor variation of the harmony"; and the wavy lines as "a sweet nuance coming from the harmony, with a little bit of cheekiness". Finally, Stuart's drawings of the given musical stimulus and of the improvisation were cross-compared and identified, for example, the large square as a recurring icon in the improvisation drawing. After the MSC analyses for both drawings from Stuart's case were completed, they were then used to perform a microanalysis of each super-ordinate theme, which is discussed in the next section.

3.5.5 Data synthesis: Lehmann-Leman informed microanalysis of four phases

This subsection presents the final analysis procedure for synthesising and reorganising the different IPA-driven data sets of each descriptive case study into four super-ordinate themes[75]. These super-ordinate themes served to distil the improvisers' experiences into four chronological phases: ***learning***, ***ideation***, ***improvisation***, and ***reflection***. Within each descriptive case study, a microanalysis was carried out for each super-ordinate theme (e.g. *learning phase*) where the merged data sets were interpreted together through an analytic

[75] The procedure for developing the super-ordinate themes for each case was first introduced towards the end of Section 3.5.1.

framework informed by Lehmann's (1997) tripartite model of mental representations, and Leman's (2010) framework of embodied musical semantics.

This final part in the present study's analysis procedure aligns with Smith et al. (2009) in that the incorporation of a theoretical framework or external theory typically comes into the later stages of an IPA analysis (p. 166). In particular, four steps were involved in the final IPA microanalysis of the super-ordinate themes within each case: 1) sorting of data sets into four phases, 2) synthesising data sets to identify different mental representations using Lehmann's (1997) model, 3) synthesising data sets to identify different meaning constructions using Leman's (2010) framework, and 4) writing up the microanalysis of each super-ordinate theme into a narrative.

In the first step, specific components from the analysis of each data set (e.g. verbal and observational data, improvisation, and drawings) were sorted into corresponding super-ordinate themes. For instance, the analyses of Stuart's observation notes, and corresponding verbal data while learning the musical stimulus were grouped into the first super-ordinate theme called, the ***learning phase***. Next, the analysis of Stuart's observation notes, and corresponding verbal data while brainstorming before his improvisation were grouped into the second super-ordinate theme called, the ***ideation phase***. Meanwhile, the phenomenological analyses of Stuart's drawing of the improvisation, Stuart's improvised performance, the observation notes, and Stuart's corresponding verbal data were grouped into the third super-ordinate theme called, the ***improvisation phase***. Finally, the corresponding phenomenological analyses of Stuart's improvised performance, his drawings of the musical stimulus and improvisation, observational, and verbal data were grouped into the fourth super-ordinate theme called, the ***reflection phase***.

The second step consisted of synthesising different data sets for each superordinate theme (e.g. *reflection phase*). This involved an iterative process of identifying different mental representations from the improvisers' drawings[76] and verbal data[77], whilst using the transcribed improvisations and observation data to triangulate the analysis. To help ensure a coherent analysis of different data sets across the four super-ordinate themes (e.g. *learning, ideation, improvisation, and reflection phases*) within each case study, a protocol was

[76] See, for example, Sections 4.5 and 5.5.
[77] See, for example, Sections 4.2, 4.3, 4.4, 5.2, 5.3, and 5.4.

developed based on Lehmann's (1997) tripartite model. This protocol, shown in box 3.3, specified the strategies for identifying three kinds of mental representations from drawings and verbal data.

Box 3.3: Protocol for analytic framework informed by Lehmann (1997)

Three kinds of mental representations	Description according to Lehmann (1997)	Strategies for analyzing drawings and verbal data
Of actual performance	*Awareness and ability to hear oneself play (p. 156) *Monitor their own playing (p. 156)	*Recalling what was played *Describing their experiences, including their moods and feelings *Evaluation of the performance *Explaining the meaning of musical expressions *Drawings depicting sound or experiential events of the improvisation
Of the desired performance	*Anticipate how the piece will sound (p. 156) *Represent what is possible to play and what will be acceptable to audience (p. 143)	*Consideration of performance context *Consideration of audience *Consideration of musical style *Consideration of any other ideas or inspiration *References to decision-based intentions[78]
Of production aspects	*Represent production aspects of the music, which is unique to the musician. (p. 156) *Intricately linked to instrument (p. 156) *Inferred anticipations and stored patterns (p. 143) *Making minute adjustments (p. 143)	*References to implementation-based intentions[79] *References to implementation challenges *References to implementation experiences *References to implementation approaches *References to changes in playing *Drawings depicting the experiences of playing, or to the instrument itself *Drawings depicting different sound textures

The synthesis of multiple data sets continued into the third step, where each superordinate theme (e.g. *phases*) was subjected to another round of iterative analysis. This time, Leman's (2010) framework, which was introduced earlier in Section 2.1.2, was used to identify different types of meanings that the improvisers have constructed from their drawings and verbal data[80]. For example, a microanalysis of Stuart's *improvisation phase* using Leman's (2010) framework revealed that Stuart had constructed a set of *collaborative, extra-musical,*

[78] This point is supported by Gollwitzer's (1999) claim that "intentions…cause mental representations…to become highly activated and thus easily accessible" (p. 497) and Leman's (2010) assertion that "meanings…[result] from processes that mediate intentions to physical realities" (p. 56).
[79] See previous footnote.
[80] Like step two, the transcribed improvisation and observation data were used to triangulate the analysis.

causal, and *corporeal* meanings during variations ten and eleven[81] [82]. In particular, *collaborative* meanings refer to Stuart's attempt to keep the communication interesting with the audience, while *extra-musical* meanings were drawn from Stuart's self-narrative description. Meanwhile, *causal* meanings refer to Stuart's imagination of activities behind the sound source[83], which is evidenced by his verbal data, and the musical analysis showing sudden changes into a loud dynamic level, thick chords, and sweeping two-octave arpeggios in these two variations. Finally, *corporeal* semantics refer to meanings that become significant through body movements, which are evidenced by Stuart's physically indicative metaphor of 'I can *fight* this', and his drawing that illustrates a pair of feet climbing up the stairs to symbolize strength[84].

In the fourth step, the microanalysis of each super-ordinate theme was written into a narrative, in accordance with the IPA guideline provided by Smith et al. (2009). Writing the microanalysis was an iterative process, in the sense that the "analysis continues into the writing phase [where] there is not a clear-cut distinction between analysis and writing up. As one begins to write, some themes loom large, others fade, and so this changes the report" (*ibid*., p. 108-110). Together, the microanalyses of the super-ordinate themes from both cases served to answer the research questions regarding the nature, formation, and role of each kind of mental representation.

The table in the following page, then, provides a summary of the analysis procedure of the data sets used to answer the research questions.

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[81] In particular, Stuart had provided several descriptions and demonstrations for two variations in his improvisation. Stuart's verbal data pertaining to variations ten and eleven comprised three components. The first verbal account was a self-narrative description: "I can do this, I can fight what happens". Following his self-narrative, Stuart analyses his thought process: "See, there's the mixture of thinking, let's have a contrast to keep the communication interesting. And then thinking: back to the emotion – I can fight this." Stuart then explains how these thought processes are translated into the performance: "So there's more energy, there's more volume, there's more thickness, and chords".

[82] See Section 4.4, as well as Appendix A.1.10 and A.1.11

[83] According to Leman (2010), causal semantics in music implies the activity of agents that might have caused the sonic (musical) patterns, or that the sonic patterns are themselves perceived as agents involved in causation…the focus is here on agency, that is, on the action or the intervention that produces a particular effect, however, concrete or abstract it may be. Causal meaning formation can be said to involve the imagination (perhaps the representation) of the sound-source. (p. 51-52).

[84] In addition, Leman (2010) explains that that corporeal semantics can also be identified from other experiential aspects relating to a person's "mental state of flow", which includes their attention focus, experienced quality of performance, type of control, intrinsic interest, experienced challenge, required skills, enjoyment, mood and motivation, and so on." (p. 53-54). See also Section 4.5.2., as well as tables 4.13 and 4.14.

Table 3.3: Summary of the research design and analysis procedures

Qualitative methodology ↓						
Interpretative phenomenological approach (Smith et al., 2009) ↓						
Phenomenologically informed multiple case design ↓						
Two descriptive case studies, bounded by two improvisers' performances ↓						
Methods	**Data sets**	**Analysis procedure**	**Phases of analysis for each case**			**Research questions**
			1	**2**	**3**	
Semi-structured interview (*Five to six hours per case, each conducted in one day)*	Interview transcription (*12 hours total for two cases, including follow-up interviews*)	Interpretative phenomenological analysis procedure (Smith et al., 2009)	**Three layers of exploratory analysis:** (1) Descriptive analysis -linguistic analysis -conceptual analysis	Developing and comparing Emergent themes ↓	↓ **Combination, interpretation, and presentation of data sets using a Lehmann-Leman analytic framework** ↑	Improvisers' descriptions and explanations of drawings are used to examine their mental representations of the actual performance, and how production and goal-based mental representations are formed.
Embedded elicitation tools		Phenomenological musical analysis (Ferrara, 1984).	**Three layers of analysis:** (1) open listening analysis (2) syntactical (traditional) musical analysis (3) semantic analysis of musical meaning	↑ Corroborating and developing super-ordinate themes ↓		Musical transcriptions provide evidence from real-life practice of how improvisers' mental representations of production aspects are realized.
Music elicitation	Transcriptions and recordings of improvisation performances					
Graphic elicitation	Participants' drawings	Phenomenological MSC method of graphic analysis (drawings) (Elkoshi, 2004).	**Three categories of analysis to identify:** (1) metaphorical elements (2) structural elements (3) conceptual elements	↑ Corroborating and developing super-ordinate themes ↓		-Drawings of musical stimulus identify how elements of goal-based mental representations are formed. -Drawings of improvisation identify improvisers' mental representations of actual performance.
Observation	Notes of participants' actions	Interpretative phenomenological analysis procedure (Smith et al., 2009)	Two layers of exploratory analyses: (1) descriptive analysis (2) conceptual analysis	↑ Developing and comparing Emergent themes		Identify playing actions that explain how production-based mental representations are realized.

3.5.6 Ensuring quality and trustworthiness

In order to meet the required quality standards expected in IPA research, Smith et al. (2009) recommends that researchers follow the guidelines of a criteria developed by Yardley (2000)

for qualitative studies. In particular, Yardley proposes four principles for assessing qualitative research. These principles are presented in the following, together with how they were implemented in the present study.

(1) ***Sensitivity to context.*** This principle refers to the researcher's sensitivity to the existing literature on the topic, how the context of the study is situated in the literature, and the material obtained from the participants. According to Smith et al., the sensitivity to the context can be shown by a researcher's awareness of the existing literature, which can "be either substantive or theoretical…the latter [*related*] to the underpinnings of the research method itself" (p. 180, my italics). As such, in the present study, a review of the *theoretical* literature was presented, which conceptualized 'mental representations' as skilled improvisers' constructions of their meaningful experiences. The review of theories, models, and frameworks by Lehmann (1997), Leman (2010), Pressing (1988), Clarke (1988), and Pike (1974) directly informed the choice of qualitative methodology, which makes use of an IPA approach and a phenomenologically informed multiple case design to examine the experiences of three improvisers and their improvisations in-depth. Considerations for the participants were discussed earlier in Section 3.4.3, where steps were taken to ensure that the improvisers were at ease, such as conducting the interviews in a familiar setting, and showing empathy during the interview process.

(2) ***Commitment and rigour.*** This principle refers to researcher's attentiveness to what their participants have said and the thoroughness of the study. This includes a careful selection of participants that are appropriate for the research questions, conducting good in-depth interviews, and undertaking a thorough and systematic analysis procedure. In the present study, the rationale for investigating *skilled* improvisers was presented in Section 1.1, and emphasized throughout the literature review by examining models of improvisation at the expert levels. The justification for employing three improvisers as in-depth case studies was presented for in Section 3.4.1, where I argued for conducting a deep examination of how their 'mental representations' are constructed from their experiences. For the analysis procedure, Smith et al. (2009) assert that a small sample size of four participants generally leads to three major themes for each participant, and as such, each theme should be supported with extracts from each participant (p. 182). In the present study, the first-order and second-order analysis for one participant resulted in the development of three super-ordinate themes. Each super-

ordinate theme underwent a microanalysis that is then written up in a narrative form, showing verbal, musical, and visual extracts in the form of interview and musical transcripts, and the drawings produced by the participant. The corroboration from different types of data also served as a form of triangulation for the findings.

(3) ***Transparency and coherence.*** This principle refers to the coherence of the overall argument in the study, and the clarity of description of the entire research process. This includes how the participants were selected, how the interviews were conducted, the analysis procedure, and the write-up process. As such, Section 3.4.2 has presented a detailed description of how the participants were selected for the pilot study, the dates and locations of the interviews, and the amount and types of data that were collected. Section 3.4.2 also explained in-depth how a set of analytical procedures was constructed to specifically analyse each type of verbal, visual, aural, and observational data. A precise description of the extensive analysis procedure was then presented in Section 3.5. Specifically, the procedure involved four steps for analyzing: (1) the verbal and observational data with IPA analysis (Smith et al., 2009); (2) the improvisations with a phenomenological musical analysis (Ferarra, 1984); (3) the improvisers' drawings with the phenomenological MSC method (Elkoshi, 2004); and (4) the microanalysis of each super-ordinate theme using a framework of embodied musical semantics (Leman, 2010). The present study established a coherence of the data analysis by presenting a chart in Section 3.5.4 to illustrate how the analytical procedures used each type of data to answer the research questions that emerged from the literature review.

(4) ***Impact and importance.*** This principle refers to whether a study is important, useful, or interesting. With regards to the usefulness, the literature review of the present study has brought together several models of improvisation by Clarke (1988), Pressing (1988), and Pike (1974) by presenting them in Lehmann's (1997) theory of 'acquired mental representations', in order to show how these models interrelate. The present study has also made a methodological contribution by using IPA creatively with multimodal methods. This includes constructing and implementing a set of analytical procedures that combines the analysis of more traditional data, such as verbal and observational materials, with the analysis of other types of data, such as music performances, and drawings.

3.6 Chapter Summary

This chapter has introduced and defended the study's interpretivist-social constructivist epistemology and qualitative methodology. The chapter then moved to justify the rationale for adopting an interpretative phenomenological approach (Smith et al., 2009), the use of a phenomenologically informed multiple case design, and the choice of a small sample to feature two descriptive case studies. This led to a presentation of the methods of data collection, where I argued for using a semi-structured interviews embedded with music and graphic elicitation tools, a methodological choice that was informed by previous studies that have investigated improvisers' experiences and their performances. Following this, the research design of the study was presented to show how the qualitative methodology, methods of data collection, and the interpretative phenomenological analysis procedure were used to answer the study's research questions. The lessons taken from the pilot study, concerns of reliability and trustworthiness, and the issues of ethics are discussed with regards to the research design.

PART III: IDENTIFYING 'MENTAL REPRESENTATIONS' IN THEMATIC MUSICAL IMPROVISATION

Chapter 4: First Descriptive Case Study – Stuart Jones

This chapter presents findings of one improviser's (Stuart Jones) perceived mental representations and meaning constructions as the first descriptive case study, drawing on the IPA, MSC, and musical analysis of multiple data sets comprising verbal, performance, observations, and drawings that were collected from Stuart's interview. This chapter is split into six subsections. It begins with an introduction to Stuart and his interview setting. Sections 4.2, 4.3, 4.4, and 4.5 presents the different types of mental representations and meanings that were found during Stuart's learning, ideation, improvisation, and reflection phases. The chapter concludes with a summary in Section 4.6.

4.1 Introducing Stuart Jones and the interview setting

This section presents the context of the setting for Stuart's four-hour interview that had taken place on 23rd July 2013. It provides information about the interview format and its process, which had taken place after I had first contacted Stuart by email on 7th July 2013 to introduce myself my PhD research. The following presents a descriptive narrative of the key events from that day.

It was around 1:00 pm on a Tuesday afternoon when my train arrived at the Coldfield Sutton railway station in Birmingham. As I exited the station, I saw Stuart standing beside his parked car at the entrance. Although we had not met before, I recognized Stuart from watching several of his live improvisations on YouTube. Stuart Jones, a 53-year-old Caucasian male, is a professional musician from the United Kingdom. Born in Birmingham, Stuart has remained there since 1963, where he works as a composer, performer, and music teacher. As a composer, Stuart has produced forty-four albums of his own compositions since 1995, which include a collection of over 360 songs, solo piano works, a symphony, a modern concerto for acoustic speed funk pianos, and two musicals. According to one of Stuart's webpages, his compositions cover an extensive range of genres including popular, rock, jazz, classical, new age, indie, electronic (including drum and bass, house, and trance), experimental, and 'Piano Speed Funk', a genre that Stuart had invented. At least sixteen of his albums, which feature mostly meditation and relaxation music, are currently available on iTunes and Amazon where they have collectively received a total of 57 favourable reviews (a rating of at least 4.6 out of 5 stars). Stuart's compositions have been heard on the BBC Radios 1 and 2, EMI Production

Music, as well as on television, including ITV, BBC Midlands, and the British soap opera 'Emmerdale'. Most recently, the Mozart Symphony Orchestra performed his *Symphony in F* alongside works by renowned English composers Vaughan Williams (1872-1958), Edward Elgar (1857-1934), and Eric Coates (1886-1957) in a concert titled "English Masterpieces" at the Cadogan Hall in London.

Realizing who I was, Stuart greeted me warmly as I waved and walked towards him. After just a five-minute car ride, we pulled into his driveway on a small and quiet suburban street. As Stuart led me into his house, I spotted the brown upright piano that had been used to record many of his duos and solo improvisations. We continued past it, however, and headed into the backyard towards a cabin that Stuart had converted into his music studio. Upon entering it, I again recognized parts of the music studio from some of his improvisation videos.

Looking inside, I understood why Stuart had suggested having the interview in his studio. Designed as a personal and separate space from the rest of the house, the layout of Stuart's music studio was catered to accommodate a variety of musical activities. The small rectangular room was packed with an extensive collection of instruments including an acoustic drum-kit in one corner, two electric guitars, and at least five different types of keyboards ranging from an electric piano with eighty-eight weighted keys to smaller-sized synthesizers. On opposite sides of the room, pairs of keyboards were set up closely top of one another at various heights to allow Stuart to play simultaneously on several keyboards while sitting or standing. Two adjacent walls were lined with shelves of CD recordings, sheet music, speakers, microphones, and recording equipment. The picture below gives a glimpse of a part of Stuart's music studio.

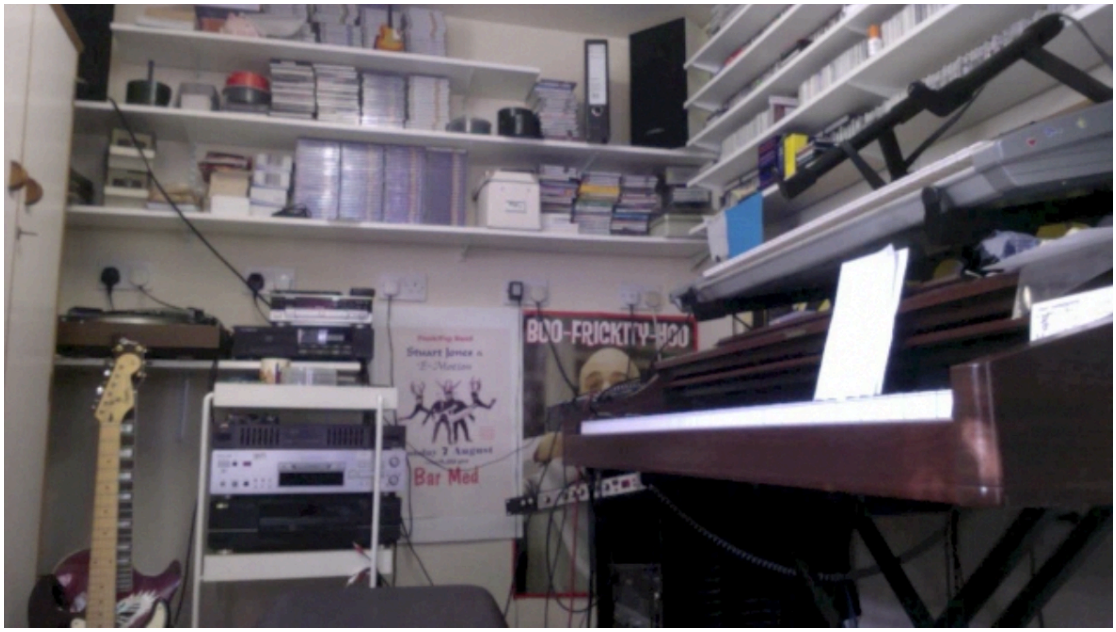

Figure 4.1: A partial view of Stuart's music studio.

While I was setting up my laptop camera to record our interview, I noticed that Stuart had chosen his instrument and was sitting on a bench by the electric piano. Following his lead, I sat about one meter away facing the piano's right side, near the studio entrance. I placed my laptop on a small table next to me, positioning it so that the built-in camera was facing Stuart, who looked and pointed into the camera as he saw himself on the laptop screen.

Before pressing the record button on my laptop, I wanted to put Stuart at ease, as he appeared to be slightly nervous for our interview. Revisiting the consent form that I had sent to him to read over during the previous week, I briefed him again about the overall format of the interview, taking care to emphasise that I am interested in learning about his multimodal (and emotional) experiences during process of improvising. I also pointed out that the procedures and interview questions are meant to help him draw out his thoughts, and that he should treat this interview like a conversation, where he assumes the role of the expert improviser. I also reminded him that a big part of the interview would center on him improvising a solo based on three given melodies, and then discussing his improvisations.

I started the interview by asking Stuart questions about his thoughts on improvisation, a discussion that lasted for the full first hour. I wanted to let Stuart lead this part of the interview as he had much to say on the topic. During this time, Stuart, who was sitting beside his electric piano, would often play on it to demonstrate the music he was referring to.

When we reached the second hour, I saw that Stuart was relaxed and looked sufficiently warmed-up, having played the piano for some time. At this point, I suggested playing from my laptop one of the melodies that I wanted him to improvise on. I began playing a piano recording of "Answer Me", a twenty-second lyrical tune that I had also presented to a previous participant. After Stuart had listened through the entire tune once, I explained to him that he could listen to the recording as many times as he wished until he felt familiar enough with the melody (and harmony, if possible) to improvise on it. Again, I emphasized that I was interested to know what his thought processes were as he was learning the tune, including any images, associations, ideas, and emotions that came into his thoughts. Sometimes, Stuart would ask me to stop playing the recording at the end of a phrase in order to reproduce a part of the melody on his electric keyboard. This process took about ten minutes.

When Stuart felt comfortable in playing through the whole tune from memory, he began to play on the electric piano in an exploratory manner, where he tested out several ideas and made other adjustments, such as modulating to a more manageable key. Seeing that this exploratory playing helped Stuart to set up the mood for his improvisation, I told Stuart that he could ease into his improvisation when he is ready without having to stop and start over. After about ten more minutes of exploratory playing, Stuart moved into improvising without a break and produced a six-minute improvisation. When he finished, I immediately asked him several questions about what he had thought about during the experience. We then proceeded to listen to a playback of his recording where he commented on aspects of his improvising experiences (e.g. what he was trying to express) as it was playing, occasionally pausing the recording when he was providing a longer explanation. This process took about twenty-five minutes.

Finally, during a retrospective graphic elicitation technique, I asked Stuart to draw both the musical stimulus and his improvisation in a way that will "help him to remember what it was", a technique that was adopted from Barrett's (1999, 2000, 2001) studies on children's invented notation (see Section 3.3.3). I emphasized that this was not a music notation exercise, but that he could use any symbols or shapes to illustrate what he had heard and remembered. With a sheet of paper and pen, Stuart drew his representation of the stimulus on one side of the page, and his improvisation on the other side. When he had completed both drawings, I asked him

to explain to me what parts of the musical stimulus and his improvisation was represented in each drawing. This process took approximately fifteen minutes.

The entire process was approximate fifty minutes long, which included playing to Stuart the recording of “Answer Me” and having him improvise on it, then commenting on the improvisation and finally, producing and commenting on the drawings. The same process was repeated for the next two musical stimuli, “Faith in Donkeys” and “A Grey Night”, each also taking a similar amount of time. Stuart and I did take ten-minute breaks between each improvising session. In total, our interview lasted four hours, during which Stuart had recorded three improvisations.

4.2 Learning: progressive production-based representation

This section explores Stuart's 'learning and brainstorming' phases, which had taken place before his improvisation. Drawing from Stuart's comments and the observations I had made during our interview, the following focuses on how Stuart had learned the given musical stimulus and then generated musical ideas from it. Recalling the interview procedure from Section 4.1, I had asked Stuart to listen to a twenty-second audio clip featuring an instrumental version of the song "Answer Me" that was performed by pianist George Shearing. I explained to Stuart that he could listen to the recording, as many times as he wished until he felt familiar enough with the melody and the harmony to improvise on it. In total, Stuart listened to the recording six times over a span of seven minutes. Stuart had spent four times listening to the entire clip and two times on particular Sections, asking me to pause the recording after each time so he could replay what he had heard on the piano. During this process I also encouraged Stuart to share with me his thoughts while he was learning the stimulus, including any images, associations, ideas, and emotions that he was thinking about.

This section is divided into two parts. The first part presents the learning phase, discussing how Stuart memorised the musical stimulus. During the learning phase, Stuart had formed a production-based mental representation of the musical stimulus. This mental representation involved Stuart assembling various forms of physical, conceptual, and cultural knowledge of the musical stimulus, and then creating connections between them in order to memorise and reproduce it on the piano. Such knowledge included the location of specific registers, the topography and fingerings of the melody and harmony, the identification of the key and musical genre, and the dynamics and articulation of a musical expression. These connections that Stuart had created can be seen as various ways of storing and organising his knowledge of the musical stimulus. Moreover, these connections can be understood as four different types of constructed meanings – causal, representational, corporeal, and referential – that were identified from Stuart's comments and actions at the piano. The following presents these meanings over six Sections to show their construction and development while Stuart was learning the musical stimulus.

4.2.1 Construction (representational, causal, referential)

After listening to the entire recording for the first time, Stuart had constructed representational, causal, and referential meanings of the musical stimulus by assembling his knowledge of the key, the topography, and the musical genre. In particular, Stuart focused on: 1) identifying the key of the musical stimulus, 2) locating the exact register of the melody on the keyboard, and 3) identifying the precise notes in the melody. Having done so, Stuart then identified the musical genres that he had associated with the recording.

Box 4.1: Observation of Stuart's first hearing of the musical stimulus

F: First, I'm going to start with this [recording]. This is a recording by pianist George Shearing and he later used [the melody] as an improvisation. It's a twenty-second clip, as you can see…so, I'm going to play it as many times as you want.

S: (Listens to the entire clip). Let me just try that. (S starts playing in D major.) Is it in D [major]? (S plays the first to third phrases of the melody accurately in D major, in the high register with an improvised left hand accompaniment). It was something like that wasn't it? Okay. It reminds me of a pop song as well that does that, but that's how I can do it as much as that. It's very [much] like a...a pop song. So is that like a classical tune? Well, it does sound just like uh…but yeah…

(Source: Second hour, semi-structured interview, 23 July, 2013)

Stuart had constructed his representational meanings of the given musical stimulus with remarkable speed and accuracy. First, he had immediately replicated the first three phrases of the melody from the musical stimulus, suggesting that a similar version existed in his musical knowledge. His rapid identification of D major was also very close to the actual key of D-flat major in the recording, indicating that he was very experienced in learning music by ear. Furthermore, Stuart's construction of his causal meanings is shown by how swiftly he had reproduced the melody in the same register on the piano. In particular, Stuart's fast learning pace implied his ability to imagine two types of agency using the information he had extracted from the recording: 1) the rhythmic and sonic patterns of the melody as an activity-based agent (e.g. Stuart hears the melody and is able to map the sounds onto the keyboard and imagine the necessary physical pathways to reproduce it) and 2) the keyboard register and the fingerings required for playing the melody as a physical agent). Stuart's construction of this causal meaning will undergo a series of changes in the following sections. Having constructed his representational and causal meanings of the musical stimulus, Stuart then constructed two

referential meanings that are both intra-musical. Stuart's first intra-musical meaning was created when the melody reminded him twice of a similar "pop song" in his musical knowledge. Meanwhile, Stuart's second intra-musical meaning was created when he associated the musical stimulus with the "classical" music genre.

4.2.2 Revision (representational), Development (causal)

During the second hearing, Stuart revised his representational and causal meanings of the musical stimulus. In particular, he formed a new connection between two forms of knowledge: his theoretical knowledge of a new key (D-flat major) and his practical knowledge of the key's topography on the piano. After the first hearing, Stuart decided to double-check his understanding of the key by re-listening to the recording and playing along with it. As Stuart was playing along with the recording, he realised that the actual key of the recording was a semitone lower, which led him to revise his representational meaning of the musical stimulus. Stuart then reproduced the melody in the new key of D-flat major on the piano, thereby also altering the causal meaning he had constructed earlier. The excerpt below illustrates how Stuart had rapidly switched between revising his representational and causal meanings of the musical stimulus.

Box 4.2: Observation of Stuart's second hearing of the musical stimulus

S listens to the recording from the beginning. After hearing the first three notes of the melody, S begins to accompany the recording. He strikes a low register D major chord in his left hand, and pauses for one second. As he hears the next three melodic notes, he mutters a soft "oh," realizing that the recording is in a different key and quickly plays another chord in D-flat major. S then begins to play the melody in D-flat major but pauses after the first three notes.

F: I can stop here (F pauses the recording nine seconds after, at the end of phrase two to let S run through the melody without distractions).

S: Yeah, okay. (S replicates the first two phrases of the melody in D-flat major with an improvised left hand accompaniment, and while doing so, talks to F simultaneously). So that would just be playing what I've heard there…but do you mean if then I try to improvise on it?

F: Yeah, that's right, but I'm also interested in seeing your approach to understanding the harmony and the melody in this [audio] clip.

S: Yeah, okay.

(Source: Second hour, semi-structured interview, 23 July, 2013)

As the excerpt shows, Stuart's construction of his representational and causal meanings appear to be closely linked, where changes in the former would immediately lead to changes in the latter. It could be further argued that Stuart had replayed the melody in D-flat major to create a reconnection between the two meanings. Stuart was also able to speak with me while replicating the melody and improvising his left-hand in D-flat major. Once again, his ease and familiarity with the melody suggests that there was a pre-existing representation of a similar melody in his musical knowledge. Additionally, Stuart's ease in switching from playing in D major to D-flat major – two keys that require very different fingerings on the piano – suggests that the construction of his causal meanings had likely been based on a corpus of pre-existing fingerings (of different keys) in his musical knowledge. Meanwhile, Stuart's improvised left-hand accompaniment remained different from the recording, suggesting that he considered the melody to be the primary component he needed to learn first.

4.2.3 Development (representational, causal), Construction (corporeal, referential)

During the third hearing, Stuart had constructed a corporeal meaning as well as another referential intra-musical meaning of the musical stimulus. In addition, Stuart continued to

develop the representational and causal meanings he had constructed earlier, by adding more details and thus reinforcing the connections between his knowledge of the harmonic structure and the topography on the piano. After the second hearing, I had encouraged Stuart to share more of his thoughts, reminding him I was interested in the way he understood the musical stimulus in terms of its harmonic and melodic components. As such, this time Stuart shared several harmonic associations he had formed from the recording, as shown in the excerpt below.

Box 4.3: Observation of Stuart's third hearing of the musical stimulus

S: (S listens to the entire recording) Actually yeah, I see it as a I-IV-V chord progression straight away, with the odd minor thrown in.

(S plays the end of the melody twice in D flat major).

S: Yeah, it's sort of a...(S starts to play the chords D-flat, A-flat, G-flat, D-flat while humming the melody).

S: Er, there's a minor, there's a minor [chord] somewhere. (S plays a D-flat minor chord).

S: So...(S starts humming the melody again, this time louder, while playing the harmonic progression in his left hand. When he reaches the second phrase, he identifies the location of the minor chord).

S: There! (S plays a G-Flat minor chord. S then continues to sing phrases three and four while accompanying with his left hand).

S: Yeah, to me that is a I-IV-V, so it's just like...(starts playing sonata in C major K545 by W.A. Mozart)...when I first heard that, so that's one I-IV-V chord progression. Let's have another listen.

(Source: Second hour, semi-structured interview, 23 July, 2013)

The development of Stuart's representational and causal meanings of the musical stimulus involved Stuart adding two more pieces of information about the harmonic structure. The first piece of information was Stuart's identification of the I-IV-V progression, while the second piece of information was his identification of a minor iv chord. For the latter, Stuart needed to hum and physically replay the musical stimulus from the beginning in order to pin down the precise timing of the iv chord's appearance with the melody. Stuart's actions suggest that in

order to incorporate the iv chord into his representational and causal meanings, he needed to construct a corporeal meaning of the musical stimulus through his tacit embodied knowledge. In other words, it was necessary for Stuart to physically experience the first two phrases of the musical stimulus through movement 'in time' (e.g. to physically play through the music) in order to identify the iv chord's precise location in the second phrase (e.g. representational meaning) and how to insert and play it (e.g. causal meaning).

Next, Stuart's association to W.A. Mozart's sonata in C major, K. 545 is a referential (intra-musical) meaning that he had constructed to exemplify a typical I-IV-V progression in the western music tradition. Furthermore, it is possible that Stuart had constructed this referential (intra-musical) association to Mozart's sonata – and even played through a part of it – as a way to reinforce his representational and causal meanings of the musical stimulus. This is supported by the fact that earlier in the interview Stuart had already improvised an accompaniment based on a I-IV-V harmonic progression and then had explicitly described it as such. It should be noted that thus far Stuart had focused on learning the melodic (right hand) and the harmonic (left hand) components of the musical stimulus separately. In fact, Stuart had avoided playing in his right hand while he was learning the chords in his left hand, preferring instead to sing the melody.

4.2.4 Development and Expansion (causal)

Having established the general harmonic structure of the musical stimulus, Stuart turned to further develop his causing meanings of the musical stimulus by learning the actual accompaniment part in the recording, which until now had been completely improvised. In particular, Stuart focused on the texture of the left-hand accompaniment. While listening to the first two phrases, Stuart noticed that the left-hand accompaniment featured a pattern of descending chords that started at the higher register on the piano. Stuart's comment of 'just one chord in the bass' indicated his awareness of the sparse accompaniment texture, where a series of sustained chords were heard one at a time on the downbeats of the melody.

Box 4.4: Observation of Stuart's fourth hearing of the musical stimulus

S: (S listens to the recording until the end of phrase two). Yeah. So what I heard then, was sort of...(S plays the melody in a higher register, accompanied by single sustained chords in his left-hand)...just one chord in the bass...(S continues to talk while playing simultaneously)...something like that isn't it? (At this point, S's improvised left-hand accompaniment starts to feature some rock-like rhythms)…Something like that?

(Source: Second hour, semi-structured interview, 23 July, 2013)

In reproducing a similar chord progression on the piano, Stuart had added details of both the texture and the rhythm of the accompaniment into his causal meaning of the musical stimulus. In addition, by applying his new knowledge of the chord texture to his previous knowledge of the harmonic structure (e.g. the I-IV-V progression), Stuart had once again enriched and reinforced the connection between his representational meaning (e.g. theoretical knowledge) and causal meaning (e.g. how to reproduce the sound) of the musical stimulus. Furthermore, Stuart began to improvise his left-hand accompaniment again after learning the descending sustained chords from the recording, incorporating different and bolder rhythmic patterns in the process. Thus, Stuart had both developed (e.g. by learning the chords) *and* expanded (e.g. by improvising on the chords) on his causal meaning of the left-hand accompaniment. Stuart's departure from the original accompaniment texture (e.g. descending sustained chords) also suggests that by this point he had already decided not to use this component in his improvisation (as can been seen in Section 4.4 and Appendix A.1).

4.2.5 Development (causal, corporeal, representational)

During the fifth hearing, Stuart worked on putting the melody and the harmony together, and adding certain musical expressions and other details he had heard from the recording. First, Stuart focused on refining his representational meaning of the musical stimulus by studying its melodic structure again. While listening to the recording, Stuart noticed that there was a trill ornament in the second melodic phrase. Stuart then played through the musical stimulus slowly from the beginning (as he had done earlier after the third hearing) in order to identify the ornament's exact location in the melody, thereby further developing his corporeal meaning of the musical stimulus.

Box 4.5: Observation of Stuart's fifth hearing of the musical stimulus

S listens to the entire recording closely, and notes the trill ornament in second phrase. He then reproduces the musical stimulus on the piano with both the melody and the accompaniment in the same register and texture as the recording. His playing also starts to emulate the soft dynamics and phrasing like that of the recording.

S: Yeah, there's that de-luh-lah right there. Right...(S replays the music more slowly from the beginning, this time inserting the trill ornament into the correct location of the second melodic phrase. When he reaches the third melodic phrase, S plays an E-flat minor chord and then pauses. As his left hand searches for the next chord, S inadvertently strikes a B major chord and mutters a groan. S then plays the beginning of the third melodic phrase several times, although he still stops short after the first chord).

F: I'll get it...I'm going to play [the recording] for you as many times as you need.

(Source: Second hour, semi-structured interview, 23 July, 2016)

By reviewing his corporeal meaning of the musical stimulus (e.g. playing the melody slowing from the beginning), Stuart had also developed his causal meaning in two ways. First, by playing through the trill ornament within the melody, Stuart was able to test out and incorporate the rapid finger technique required to execute the ornament. Second, while playing through the music, Stuart also started to reproduce the phrasing and the soft dynamics that he had heard on the recording. In doing so, Stuart indicated early on that that the expressive component of the musical stimulus would become an important part in his improvisation, especially in the beginning (see Appendix A.1.1 to A.1.3). Stuart then attempted to play the second half of the musical stimulus, which was a part he had not yet studied in detail. Although Stuart showed complete fluency in the rest of the melody, he was unable to recall the accompanying chords towards the end of the musical stimulus. In particular, his unintentional strike of the B major chord suggests that he had relied more on his tacit embodied knowledge to find the new chords.

4.2.6 Development (causal, corporeal, representational, referential)

Having memorised the first half of the recording, Stuart moved on to learn new music material (specifically, the last two phrases in the musical stimulus) thus further developing his representational and causal meanings. After the fifth hearing, Stuart had tried to recall the chords for the second part of the melody, but realised that he needed more information from the recording. Starting the recording from where he had last left off, Stuart listened to the last

two phrases several times. Just before the recording had started, Stuart said, "just an extra couple of…" suggesting that he already had an idea of how many more chords to expect.

Box 4.6: Observation of Stuart's sixth hearing of the musical stimulus, part one

S: Just an extra couple of…

F proceeds to play phrases three and four from the recording. S listens to phrases three and four with his eyes closed.

While the recording is playing, S starts to play a succession of chords in E-flat minor (first inversion and then the root position) and A-flat major (second inversion) several times, with the top notes of each chord slightly different each time. Seeing that S was trying to play along with the recording, F rewinds the recording and plays the last two phrases three more times. Meanwhile, S begins to sing a sequence of notes (E-flat, B-flat, C, E-flat, and D-flat) over the chords he is playing.

(Source: Second hour, semi-structured interview, 23 July, 2013)

Stuart had constructed (and further developed) his representational meaning for the second half of the musical stimulus in two steps. At first, Stuart was repeating the chords with slight variations in the top notes, appearing to be guided by the bass notes of the chords he had heard from the recording. Later, Stuart listened to the recording again and then played the chords while singing the top note of each chord. The notes that Stuart had sung can actually be heard in the recording as a counter-melody in the left-hand. Stuart's approach suggests that he had heard the chords in horizontal layers. By focusing on one layer of notes at a time, Stuart was able to identify a melodic line from each layer by tracing its pitch movements across a sequence of chords. These layers of melodic lines in the chords then acted as anchors for Stuart to memorise the chords. Thus, Stuart learned the second half of the musical stimulus by reconstructing the harmonic structure in melodic layers. Throughout this time, Stuart's causal meaning continued to be developed as he physically played through the different versions of these chords.

At this point, Stuart had learned the entire musical stimulus and seemed to be confident in reproducing both the melodic and harmonic components. It should be noted that Stuart's learning approach had involved memorising the musical stimulus in small individual components. He had learned the first two phrases from the recording by focusing on the melody and the harmony separately, and then repeated these steps for the last two phrases.

While he was reviewing the music at the piano one last time, Stuart was able to provide a very specific harmonic analysis of what he was playing. His focus on the naming of the chords suggests that his representational meaning of the musical stimulus was largely based on the harmonic components he had heard in the recording.

Box 4.7: Observation of Stuart's sixth hearing of the musical stimulus, part two

F: Have you already mapped out the theoretical part of [the musical stimulus]?

S: Yeah, yeah…definitely, mainly just a I-IV-V, so like...(S starts to play the musical stimulus slowly while talking to F, pausing slightly after each chord to identify it)...there's a chord of I, chord of V, IV, minor [iv]…(S plays the melody with the trill ornament in phrase two). Then it's something like, erm...(S plays phrases three and four with some pauses. Phrase three featured the chord progression I - ii - I 6/3 - I 6/4, while phrase four featured the progression IV - V). Yeah, it's just all I-IV-V...yes.

(Source: Second hour, semi-structured interview, 23 July, 2013)

During his final review of the musical stimulus at the piano, Stuart had reproduced the melody almost perfectly. A few minor details in Stuart's version of the harmony remained improvised and different from the recording, such as ending the fourth phrase on a V chord instead of a I chord. Interestingly, this particular difference (e.g. the V chord ending in the fourth phrase) would be featured many times throughout Stuart's own improvisation (see Section 4.4 and Appendix A.1).

Lastly, recalling back to the beginning of the learning phase, Stuart had originally alluded to his memory of a "pop song", although he did not explicitly identify the name of the song. Stuart later revealed that he had used his knowledge of the song "Answer me" to help him learn the musical stimulus. Stuart then performed the musical stimulus on the piano and simultaneously sang the lyrics from "Answer me", showing how he had memorised the melody of the musical stimulus so rapidly. Thus, Stuart's early reference to "a pop song" may have contributed to a significant part of his referential (intra-musical) meaning of the musical stimulus from the very beginning of the learning phase.

Box 4.8: Observation of Stuart's sixth hearing of the musical stimulus, part three

F: And you said it reminded you of a rock song? Did it help you to memorise [the stimulus]?

S: Yeah, oh god yeah, oh absolutely. There's a song called...by two people...it's what it reminded me of..."Answer me", which is something like...can't sing very well…(S begins to sing the lyrics while playing a piano accompaniment)…"Answer me, oh my love, just what sin have I been guilty of"…And then it's: "Tell me how I came to lose your love, please answer me, [my love]." Someone did it ages ago, and then Barbara Dickson, I think, did it in the early 80's or the late 70's, and that was a cover of an older song…even the cover of the one I just did is late 70's.

(Source: Second hour, semi-structured interview, 23 July, 2013)

Stuart's comment revealed that he had learned the musical stimulus based on his memory of a particular performance of the song by a specific artist. In particular, Stuart had some knowledge about the history of the song, correctly pointing out that it had been covered several times "ages ago" (e.g. in 1953, 1954, 1960, 1965, and 1976) by various singers. He also noted that his knowledge was based on a much later cover of an original song, with Barbara Dickson's version from 1976 being the most recent. Additionally, Stuart correctly stated that "two people", where he was referring to the German songwriter Gerhard Winkler and the Austrian songwriter Fred Rauch, had originally wrote it in 1952. Stuart's knowledge of this song is not surprising, given that Barbara Dickson's cover of "Answer me" had been a top ten hit in the UK in 1976, and previous versions in 1953 had achieved top spots in the UK singles chart.

4.2.7 Summary

To summarise this section, during the learning phase, Stuart constructed four different types of meanings while memorising the musical stimulus by ear. The following figure shows a mapping of the progression of Stuart's meaning constructions over the course of the entire learning phase.

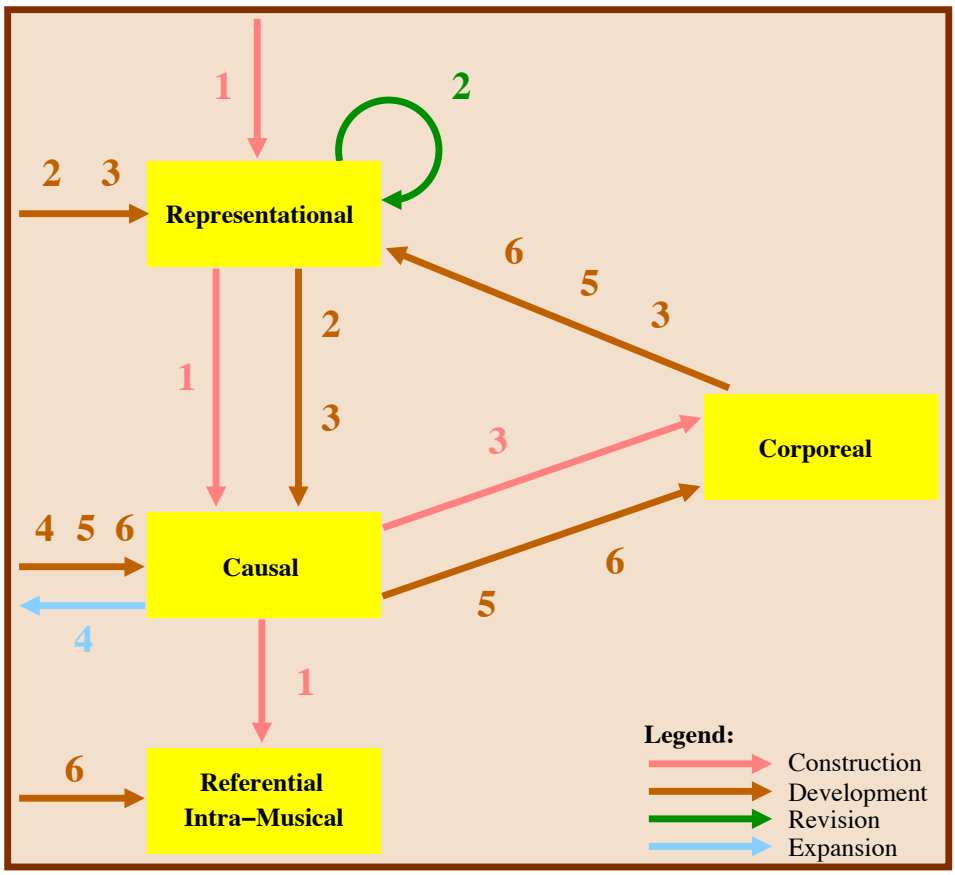

Figure 4.2: Mapping of Stuart's meanings in his representation of the musical stimulus

The figure above shows the number of hearings (indicated by the numbers) that Stuart took to memorise the musical stimulus, as well as which meanings were created during each hearing. In particular, the arrows indicate the order in which these meanings were constructed, developed, revised, or expanded upon during each hearing. In addition, the different colours of the arrows indicate which mode (construction, development, revision, and expansion) Stuart had used to form these meanings. Furthermore, the arrows also show the particular approaches that Stuart had adopted during the learning phase. Arrows that begin from the representational meaning indicate a theoretical approach, such as formally naming the key or the harmonic progression. Arrows that begin from the causal meaning indicate a more instinctive approach, where Stuart automatically reproduces the musical stimulus by ear, guided by what he heard and imagined. Arrows that begin from the referential meaning indicate moments where Stuart learned the musical stimulus by associating it with other songs. Lastly, the arrows that run through corporeal meanings indicate the moments where Stuart played through in order the phrases of the musical stimulus to reinforce his understanding of

it. As the arrows show, Stuart's use of corporeal-based learning during the third, fifth, and sixth hearings are driven by representational and causal meanings.

As shown in the figure, the first hearing resulted in Stuart's constructions (as indicated by the pink arrows) of representational, causal, referential (intra-musiscal), and corporeal meanings. Following the first hearing, Stuart's subsequent hearings of the musical stimulus resulted mostly in the further development of these meanings, as indicated by the many numbers listed beside the brown arrows. On one occasion, Stuart was known to revise his representational meaning of the key during the second hearing, as indicated by the green arrow and the number two. Stuart also expanded on his causal meaning of the harmony by improvising new harmonies during the fourth hearing, as indicated by the blue arrow and the number four.

4.3 Ideation: goal and production based representations

This section presents the ideation phase, which discusses how Stuart began to generate ideas from the musical stimulus. Having memorised the musical stimulus, Stuart moved on to generate ideas for his improvisation. Stuart's ideation phase resulted in the formation of a goal-based and a production-based mental representation. From these two mental representations, four meanings were constructed: referential extra-musical, referential intra-musical, causal, and corporeal meanings. Although all four types of meanings were present to an extent, only the most prominent meanings are presented.

4.3.1 Idea-based goal: referential intra and extra-musical

Stuart had first formed an idea-driven goal-based mental representation from his musical desires. From this mental representation, two meanings were created: referential extra-musical and referential intra-musical meanings. First, Stuart had created an extra-musical meaning from his emotional associations to positive feelings of "light" and "pleasant" from the harmonies. Stuart also noted that he has had similar reactions to these particular harmonies, and his mentioning of "pictures" suggests that many of his feelings and moods were imaged-based.

Box 4.9: Observation of Stuart's ideation phase, part one

F: What would you think of before improvising on this tune? What ideas would you get from this?

S: So if that was an emotion, then....(starts playing the musical stimulus slowly, pausing after every few notes to listen) well, first of all, just the harmony of those chords, they sound quite…not too menacing, and probably not too deep, really; quite pleasant. (S makes a wave-like gesture with his arms, which he repeats several more times as he speaks)…so, probably fairly lighthearted…That's [sic] the pictures those harmonies tend to create for me. So something fairly light, so nothing too worrying. So if I was going to improvise, if those thoughts sort of came to me I would sort of...

(S starts playing the musical stimulus, improvising the accompaniment and adding a few ornaments and rubato into the melody, while keeping the original tempo, melodic register, soft dynamics, phrasing, and light textures).

S: And then I'd probably make it more romantic. You know, naturally I'd want it to feel more romantic. So, I'd probably add some…(S starts playing in a wider register range with bigger chords, and inserting more ornaments into the melody).

(Source: Second hour, semi-structured interview, 23 July, 2013)

Stuart then constructed a referential intra-musical with his association of wanting to "make it more romantic". In particular, he replayed the musical stimulus and began to incorporate a wider range of pitches, a bolder homophonic accompaniment emphasizing the downbeats, and denser orchestral-like textures. Moreover, Stuart began to explore the musical stimulus in the parallel minor key of D-flat minor, which was accompanied by a descending bass line (also known as a 'lament bass'). The lament bass line was also featured in D-flat major on the recording that Stuart had heard.

Box 4.10: Observation of Stuart's ideation phase, part two

S: Maybe even throw in a slightly different chord to make it sound...(plays a different progression (ii-V) in the fourth melodic phrase). And probably I'd sort of go minor...(S plays the melody in D flat minor in a much higher register for the melody and the accompaniment. He then begins to improvise on variations of the first three melodic notes from the musical stimulus, accompanied by a descending bass line).

(Source: Second hour, semi-structured interview, 23 July 2013)

These musical changes, such as Stuart's incorporation of a minor key, rich orchestral texture, a wide register, a lament bass, suggests that he was referring to musical characteristics from the romantic period (1780-1910) in Western Classical music. Furthermore, Stuart's variations

on the first three melodic notes, and the use of the lament bass in a minor key would both be a significant part of Stuart's improvisation on the musical stimulus.

4.3.2 Adaptive production: causal, corporeal

Next, Stuart formed a production-based mental representation from his intention to modulate into a different key. From this mental representation, Stuart constructed causal and corporeal meanings. First, Stuart had constructed a causal meaning by imagining how the musical stimulus could be played in F major, where he would feel "more comfortable" and "could do more, and put more emotion in".

Box 4.11: Observation of Stuart's ideation phase, part three

S plays the beginning of the musical stimulus again in D-flat major, this time in the lower register of the piano. During the second phrase, S plays a wrong chord in the harmonic progression, pausing to correct a I chord (D-flat major) to a IV chord (G-flat major) before moving on to play the iv chord and the trill ornament in the melody. When Stuart reaches the third phrase, he inadvertently strikes an F-sharp in his left-hand and frowns.

S: And then I'd actually probably change into a key that I felt a little bit more comfortable so I could do more, and put more emotion in. So I might go...I'd have to do some sort of...

S modulates from D flat major to C major, then to F major, and then continues to play the rest of the musical stimulus. While playing in F major, S added bolder rhythmic and melodic variations, including several triplets and groups of four sixteenth notes. S plays the first two phrases fluently as he inserted the new rhythms, while pausing more often during third and fourth phrases.

(Source: Second hour, semi-structured interview, 23 July, 2013)

In particular, Stuart found that playing in D flat major caused him to make some mistakes in the chord progression in the left-hand accompaniment. On the other hand, F major, which comprises only one flat key, offered a simpler pathway to navigate on the piano. As such, Stuart created a corporeal meaning by modulating from D flat major into F major, or in other words, by organising his 'romantic' musical expressions into F major and playing them through in the new key.

Furthermore, Stuart's corporeal meaning continued to influence the development of his earlier referential intra-musical meaning, thus establishing a recursive interconnection between his goal and production-based mental representations. Immediately after modulating into F major,

Stuart continued to create more musical ideas in the new key. Some of these ideas (e.g. triplets and four sixteenth notes) would later feature in his improvisation (see Appendix A.1).

4.3.3 Summary

To summarise this section, during the ideation phase, Stuart formed two types of mental representations. Figure 4.3 below shows a diagram of Stuart's ideation process.

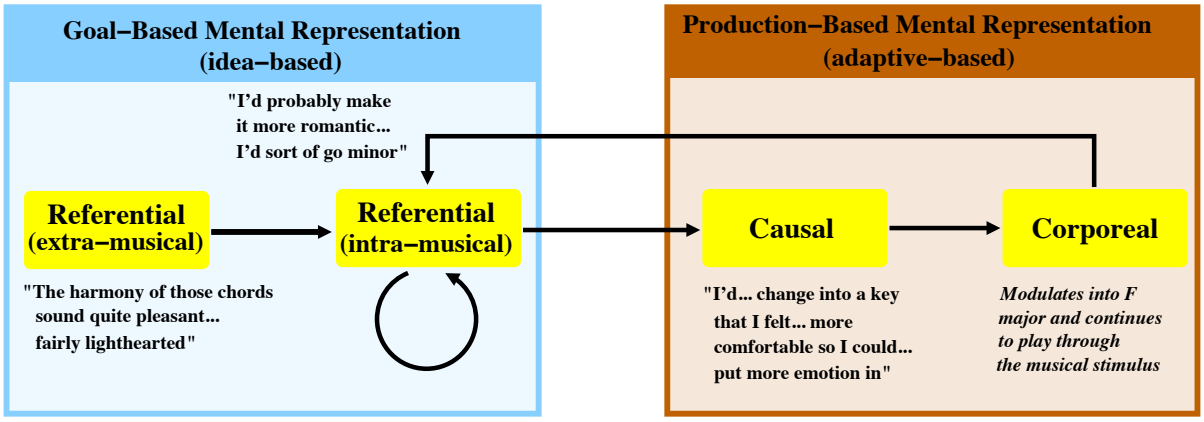

Figure 4.3: Stuart's mental representations of his initial musical ideas

The first type is an idea goal-based representation, where Stuart formed both intra and extra-musical meanings. The second type is an adaptive production-based representation, where Stuart formed two meanings: causal and corporeal. These two mental representations are interconnected through Stuart's construction of recursive referential (intra-musical) meanings in the idea goal-based representation, which suggest that Stuart's referential meaning is the central part of his ideation phase.

4.4 Improvisation: reflection, production, goal based representations

This section presents the formation and interactions between three kinds of mental representations that were present during Stuart's improvisation on the musical stimulus. The verbal, observation, and performance[85] data for the analysis had come from a semi-structured interview that had immediately taken place after Stuart's performance. Using a retrospective think-aloud protocol (see Sections 3.3.2 and 4.1), Stuart was asked to listen to an audio-replay of his improvisation and to reflect on what he was thinking about during particular moments

[85] See Appendix A.1 for a transcription and a musical analysis of Stuart's improvisation.

in his performance. The playback of the recording was paused at various points where necessary in order to allow for Stuart to expand on his reflections.

Three kinds of mental representations (goal-based, production-based, and reflection-based) emerged from the analysis of Stuart's experience and his improvisation performance. These mental representations were formed during four activities that Stuart was engaged in throughout his performance: (1) narrative-based scaffolding, (2) establishing performance flow, (3) monitoring the audience, and (4) monitoring the self. Within these mental representations, Stuart constructed five types of meanings. These meanings comprised: (1) referential (extra-musical), (2) referential (intra-musical), (3) corporeal, (4) collaborative, and (5) causal. In the following, these various mental representations and their meanings are presented over four subsections. Although many meanings were present throughout Stuart's improvisation, the following subsections focus on the meanings that were most prominent from the analysis of the verbal and observation data.

4.4.1 Narrative-based scaffolding: referential, collaborative, causal

This subsection presents Stuart's mental representations that were formed during moments where he was focused on the narrative aspects of his improvisation, and the constructions of referential, collaborative, and causal meanings that were involved. Immediately after his performance, Stuart provided a description of his improvisation, which comprises eleven variations and a coda[86]. As he was describing his improvisation, Stuart would follow with a demonstration on the piano to show the specific parts of his improvisation that he was referring to[87]. In particular, Stuart described his improvisation as a self-narrative about being involved in "a [romantic] relationship", where he expresses a journey of his feelings and emotions. Stuart's description and his demonstrations at the piano are captured in the box below.

[86] See Appendix A.1 for a musical analysis of Stuart's improvisation.
[87] This proved to be very useful for matching particular descriptions to each variation.

Box 4.12: Observation of Stuart's retrospective demonstration of his improvisation

S: It's to do with, sort of, a relationship. That would be...a real relationship that's sort of romantic, and then in comes - creeps, sort of, some.... and I didn't put too much in that then, but sort of, the tenderness of it, but then mixed with some hurt, you know...sort of some...(S plays something softly in D minor, which sounds similar to variation four from his improvisation). When it would have gone to that, sort of the absolute...hardly being able to drag yourself off the floor…

(S pauses talking but resumes playing and listening to the harmonies while keeping his eyes closed. At this point S is playing some familiar components from variations seven and eight in the mid to low register on the piano. In particular, the melody in his right-hand features (1) an accented rhythm comprising two eighth notes and a quarter note similar to variation seven, and (2) a slight dissonance in the melodic suspension similar in variation eight.)

...But still kind of thinking of the romance, and trying to tell that person that here's the feelings and "I want you to hear them" in the hope that it will improve that sort of loss.

(S continues playing a version of the minor variations. Gradually, the melody in his right hand modulates into D major and rises towards a higher register on the piano, similar to the transition from variations eight to nine).

And then, sort of regaining strength, and thinking, "I can fight this" (S starts to crescendo in his playing, similar to variation nine) …"you know, either way, I can fight what happens"…

(S lets go and plays with full volume and intensity for several seconds. His playing, which features rich, full chords in both hands, are reminiscent of the musical climax in variations ten and eleven)

…And just trying to share that you do have feelings and sensitivity. And you want him to communicate that, that you're a person who has got some feelings.

(S starts to play a decrescendo. Meanwhile, the accompaniment texture in his left-hand becomes sparser, while the melody in his right-hand goes back up to higher register. The music gradually slows down towards a soft ending. S finishes playing on the piano, and turns around on his bench to face F).

That would probably be what went on in my head. (S laughs).

(Source: Second hour, semi-structured interview, 23 July, 2013)

From Stuart's descriptions and actions, three mental representations are identified: goal, production, and reflection-based representations. First, the presence of a reflection-based representation is evidenced by Stuart's overall awareness of the actual performance. It is a

type of reflection that focuses on a global view of the improvisation. In Stuart's reflection, his improvisation is summarised as "a relationship that's…romantic". Second, Stuart expressed desires to convey messages in his music, indicating the presence of a goal-based representation. This type of goal involves Stuart's intentions of communicating various feelings to the audience. Third, Stuart's demonstration showed how he was immersed in character throughout his improvisation, appearing to act out various emotions during the production of his music. In particular, Stuart's dialogues of "I can fight this", and descriptions of "hardly being able to drag yourself off the floor" led to dramatic changes in the dynamics and modality, which suggests the presence of a type of simulative production-based representation that involves role-play. Lastly, Stuart's detailed 'talk then play' demonstration suggests that his communicative goals informed his simulation-based production, which then fed into his reflection of the performance to ensure that the music followed the narrative. Figure 4.4 below shows a diagram of the interactions between these three mental representations.

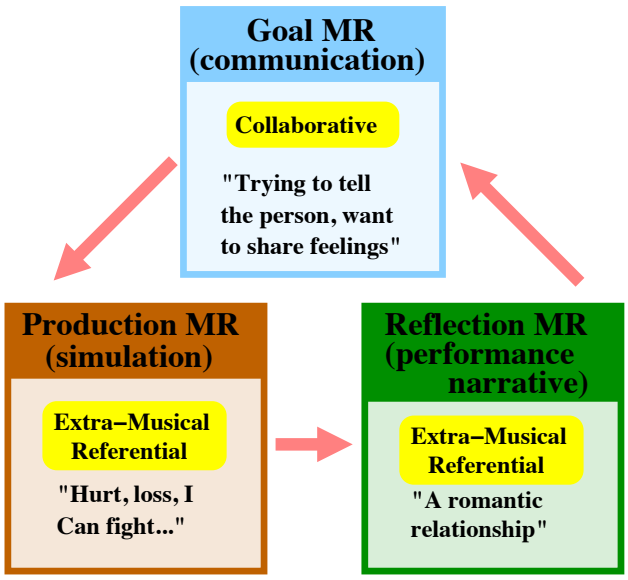

Figure 4.4: Stuart's mental representations of his whole improvisation

As figure 4.4 shows, Stuart's mental representations involved the constructions of mainly three meanings: collaborative, and two referential (extra-musical) meanings. These meanings comprised associations to social aspects of the performance, as well as non-musical (e.g. programmatic) associations. In his reflection-based representation, Stuart formed a referential

(extra-musical) association to a romantic relationship[88]. In his goal-based representation, Stuart's collaborative associations are evidenced by his references to the audience. Lastly, Stuart's production-based representation involved forming referential (extra-musical) associations to particular dialogues or imageries, from which he used to produce musical ideas through the act of role-play.

Meanwhile, variations two and three from Stuart's improvisation show a more specific example of Stuart's mental representations interacting with each other while he was attending to the musical narrative. In particular, the end of variation two features a crescendo that builds into the start of variation three, resulting in a thicker musical texture and the introduction of several new ideas[89]. At this point, Stuart was building on an imaginary dialogue with the audience[90], which he translated into the music:

> S: You know if you're in a pattern of thought, you get a surge of: "I can do this, I can do it!" and that gives you more impetus to do some deep chordal...(Source: Second hour, first improvisation performance, 23 July 2013).

Stuart's comments indicated the presence of a goal-based representation and two types of production-based representations between variations two and three. First, Stuart's goal-based representation is evidenced by his reference to a previous "pattern of thought", where he was "trying to express…tenderness" and to "communicate with the audience" in measure 12[91]. This communicative goal-based representation led to the formation of a simulative production-based representation, where Stuart was engaged in a form of role-play that involved a self-dialogue. From this first production-based representation, another type of production-based representation is also formed. In particular, Stuart described how acting out the self-dialogue gave him "more impetus to do some deep chordal" music in variation three[92],

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[88] Stuart's construction of this referential (extra-musical) meaning recalls back to a similar referential (intra-musical) meaning that he had constructed during the formation of his goal-based mental representation of his initial musical ideas (see Section 4.3.1). It had been suggested that this intra-musical meaning from Stuart's ideation phase had referred to the notion of 'romantic' in terms of romantic period in Western classical music, due to Stuart's incorporation of the musical style into his playing at that moment. It could be argued, then, that Stuart's extra-musical meaning (e.g. a romantic relationship) in his actual improvisation had originated from a reconstruction of his intra-musical meaning from his ideation phase (e.g. romantic musical style). As the following subsections will demonstrate, this extra-musical meaning would continue to have a long-term impact throughout the rest of Stuart's improvisation.

[89] See Appendix A.1.2 and A.1.3.

[90] See Section 4.4.3, where Stuart was involved in an imaginary dialogue with the audience of "trying to…admit [our feelings] together".

[91] See Appendix A.1.2

[92] See mm. 17 to 18 in Appendix A.1.3.

indicating the presence of a type of instinctive production-based mental representation. In contrast to a simulative production where music is created through self-induced emotions, for Stuart, an instinctive production appeared to involve a more involuntary approach for creating music. Figure 4.5 shows a diagram of the interactions between these three mental representations.

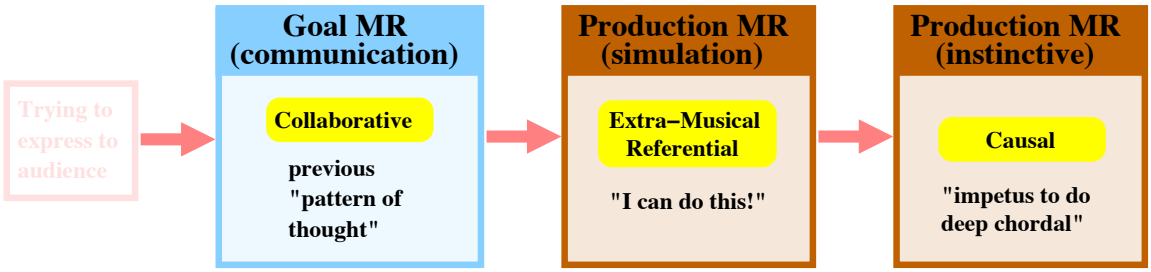


Figure 4.5: Stuart's mental representations during variations two and three

Figure 4.5 shows how Stuart's mental representations in variations two and three involve the constructions of mainly collaborative, referential (extra-musical), and causal meanings. The construction of a collaborative meaning in Stuart's goal-based representation is evidenced by his earlier reference of communicating with the audience. Meanwhile, Stuart formed an extra-musical association in his simulative production-based representation by engaging in a self-dialogue. In turn, this self-dialogue prompted Stuart to imagine "deep chordal" sounds, which he produced in variation three through an instinctive production-based representation, and thus evidencing the construction of causal meanings.

Lastly, Stuart's mental representations between variation eleven and the coda show how he used the narrative in the music to decide on an appropriate moment to conclude his improvisation. In particular, variation eleven, a climatic moment in Stuart's improvisation, features a sudden decrescendo and slowing of the tempo at the end, which leads into a calm coda[93]. At this point, Stuart felt that it was appropriate to conclude the improvisation, having resolved the emotional challenges in the narrative:

> F: How do you know when to end a piece, or continue into these climatic points? You could have gone on forever, but you decided to end it after the third or second big climatic event...
>
> S: I mean…it will sort of be different every time. It depends what mood you're in. In this context…I suppose after I did the bit where I thought: "I can fight this and get through it"

[93] See mm. 78 to 80 in Appendix A.1.11 and A.1.12.

> (S plays a version of variation 11 on the piano). That bit...then I just thought: "I've got the drive to carry on, so that's dealt with, and it's the time to stop worrying about that." I would probably have subconsciously [thought]: story told, if you like. But it's only you asking me, that I'll now analyse it and think why I've done it.
>
> (Source: Second hour, first improvisation performance, 23 July 2013).

Stuart's comment suggests that he used two mental representations between variations eleven and the coda. First, Stuart's use of role-play through the final part of his self-dialogue indicates a presence of a simulation production-based representation. This simulative production leads to the formation of a reflection-based representation, where Stuart's awareness of the performance ending is evidenced by his reference to the closing of his narrative. Figure 4.6 shows a diagram of the interactions between the two mental representations.

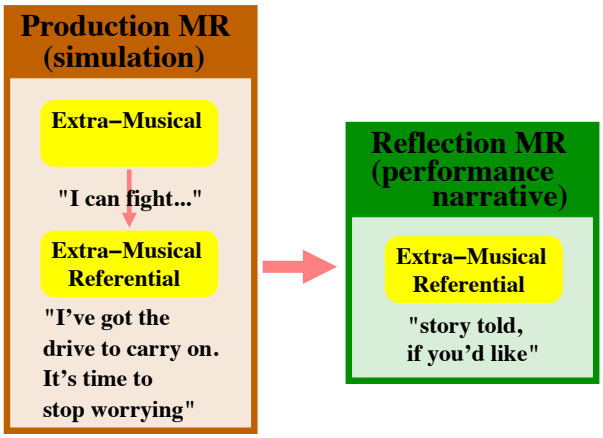


Figure 4.6: Stuart's mental representations during variation 11 and the coda

Figure 4.6 shows how Stuart's mental representations in variations eleven and the coda involve the constructions of mainly referential (extra-musical) meanings. In particular, Stuart had formed extra-musical associations while engaging in the final part of his self-dialogue during his simulative production. Meanwhile, the construction of Stuart's extra-musical meaning in his reflection-based representation is evidenced by his reference to the end of the narrative in the performance.

To summarise, this subsection has presented three kinds of mental representations that Stuart had used during moments where he was focused on the narrative of the music. These comprise (1) narrative-driven reflection-based representations, (2) communicative goal-based representations, and (3) two types of production-based representations (simulation and

instinctive). In particular, they are identified in variations two, three, eleven, the coda, as well as in Stuart's general overview of his improvisation.

4.4.2 Establishing flow: corporeal, referential

This subsection presents Stuart's mental representations that were formed during moments where he was engaged in establishing flow in his performance, and the involvement of corporeal and referential meaning constructions. The first time that Stuart was engaged in establishing flow was just before he started performing, when he was doing some 'warm-up' improvising on several musical ideas. As he was doing so, Stuart found himself overthinking and being unable to play freely.

Box 4.13: Observation of Stuart at the beginning of his improvisation.

> S: Now the problem is, at the moment I'm concentrating too much, and not letting go. I'm not actually thinking of emotional things, I'm concentrating on what I'm doing. So I'm going to try and let go now and think of something...so here we go...(Source: Second hour, first improvisation performance, 23 July 2013).

Stuart's awareness of his playing evidences the presence of a reflection-based mental representation. This self-directed reflection led to Stuart's intent to "let go", which indicates the formation of a goal-based mental representation. Stuart's goal is strategic in the sense that it directs him to think of "emotional things", which shows another example of Stuart using role-play to help him create music, thereby also forming a simulation production-based mental representation. Figure 4.7 below shows a diagram of the entire process.

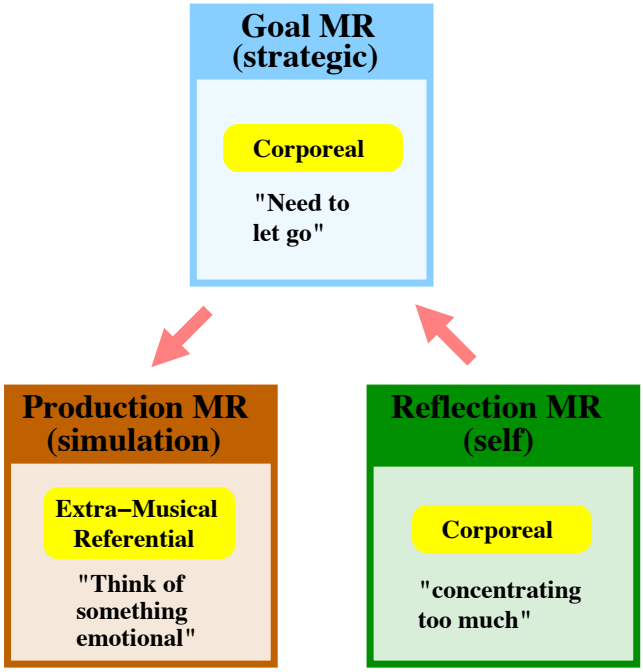


Figure 4.7: Stuart's mental representations just before variation 1

As figure 4.7 shows, Stuart's mental representations just before he started improvising involved the constructions of primarily three meanings: two corporeal, and one referential (extra-musical) meanings. These meanings comprised Stuart's associations to experienced challenges and quality of the performance, as well as his feelings and lack of enjoyment of the process. In particular, Stuart's construction of a corporeal meaning in his reflection-based mental representation is evidenced by his awareness of "concentrating too much". From this, his focus on identifying the problem and finding a solution shows his construction of another corporeal meaning in his strategic goal-based representation. To find another way to help him improvise, Stuart proceeded to think about emotions through his simulation production-based representation, thereby constructing a referential (extra-musical) meaning. Stuart later explained the importance of minimizing all distractions, most of which concerned the technical aspects of playing the keyboard.

> F: I was wondering at what part in the improvisation did you become – because you said you were kind of still conscious – when did you really let go, when did you start feeling comfortable and forgot that I was here, and that this was being recorded?
>
> S: I suppose when I said, "I'm going try to take it a bit deeper" and probably a further step then I would've been, playing purely on brain rather than... I mean, I tend to close my eyes, because the thing is, any distraction at all, even finding out what notes you're playing can be a distraction, because you're looking rather than feeling what's happening. (Source: Second hour, first improvisation performance, 23 July 2013).

Here, Stuart demonstrates a keen awareness and monitoring of his own thinking processes, evidencing another self-directed reflection-based representation, in which the construction of corporeal is also seen. In particular, Stuart's references to "playing purely on brain", "close my eyes" and "concentrating on what I'm doing" shows a type of cenaesthic perception, where he demonstrated an awareness and knowledge of his body and how it responds to the music and the environment. In particular, Stuart's use of the verbs "playing", "looking", "closing my eyes", and "doing" describes his kinesthetic experiences of movement and gesture that influence the production of the music.

Stuart noted different types of monitoring thoughts that directly affected his playing. The first type is what he calls 'playing purely on brain', which implies a more proactive thinking approach and may involve more of the senses, including vision, to help find the notes. The second type adopts an approach of 'feeling what's happening', where the role of vision is less important. Stuart's emphasis on letting go of the first 'brain'-oriented approach suggests that the technical thoughts and the thoughts that oversee the development of musical ideas cannot compete with each other while he is improvising. The former type of self reflection-based representation, however, appears to be unhelpful during performance, as Stuart explains.

> S: You see, it's okay if I [let] things off. Its like, at times I found myself thinking "what shall I do?" and then it's all gone, you see. As soon as I thought, "Oh, what shall I do next?" that's when it completely goes [apart], it just ends up being nothing - a load of nothing…(Source: Second hour, first improvisation performance, 23 July 2013).

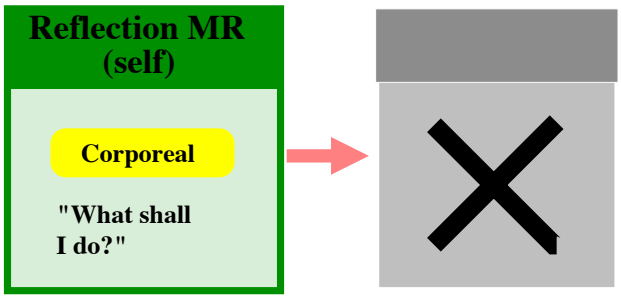


Figure 4.8: Example of Stuart unable to form mental representations

Figure 4.8 illustrates Stuart's explanation about instances where self reflection-based representations that involve this more active type of monitoring leads into a danger of thinking too far ahead. This in itself becomes a great source of distraction, which may result in a disruption of his flow state, or worse.

Variation four shows another moment where Stuart was also engaged in establishing flow. In particular, variation four features a significant change where Stuart's improvisation modulates from F major into D minor, and introduces a number of new ideas in a slower tempo (see Appendix A.1.4). At this point, Stuart was focused on fully becoming immersed and connected to the emotional aspects of the music.

> S: And probably the bit where I said I'll try and take it down to another slightly more deeper level, probably that one would have been the...
>
> F: But you talked yourself into it, or did you hear something and felt...how did that happen?
>
> S: I purposely made myself think of something that made me feel emotional.
>
> F: So it's a technique that you can use to put yourself into...
>
> S: Yeah. Oh absolutely. It's like acting, I suppose. It's like, if you're going to play somebody who's just lost a loved one, and you're thinking about a great rock band you saw last night, it's not going to happen. So you have to literally think about something that is very upsetting in your life, and then put yourself in that place. And then you probably automatically forget about what's going on around you, and you suddenly start changing your whole body language, and tears...do you know what I mean. So it's probably, yeah, and you can certainly do that…When I think about a subject that's in my head that's made me very emotional, that's when something really does happen. (Source: Second hour, first improvisation performance, 23 July 2013).

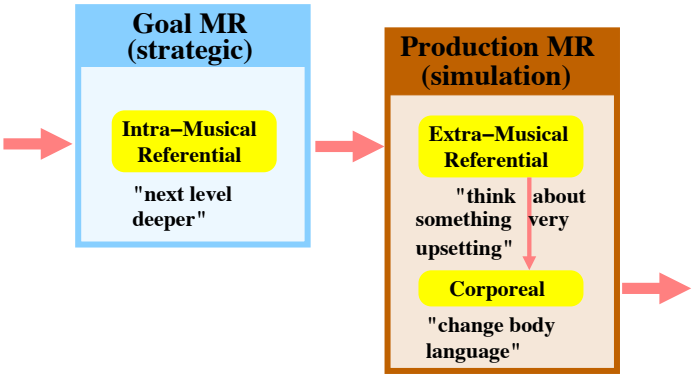


Figure 4.9: Stuart's mental representations during variation 4

As figure 4.9 shows, Stuart's decision of going deeper into the music indicates the presence of strategic goal-based mental representation. Stuart's reference to another "level", also illustrates a type of structural understanding of his improvisation, evidencing the construction

of a referential (intra-musical) meaning. This strategic goal provided Stuart with a plan, which Stuart implemented through role-playing, indicating the formation of a simulation production-based mental representation. In particular, this simulation production involved Stuart forming extra-musical associations to upsetting events he has experienced in real life, which in turn, leads to the construction of corporeal meanings through changes in body language.

To summarise this section, Stuart achieved performance flow several times throughout his first improvisation, each time through a different approach. In contrast to his first performance flow in the beginning of his improvisation, which was achieved by letting go and feeling out the music through a more passive approach, Stuart's second performance flow in variation four was achieved through a much more deliberate and conscious means.

4.4.3 Monitoring the audience: referential, collaborative, causal, corporeal

Throughout his improvisation, Stuart was frequently engaged in a type of monitoring activity that involved intentions to communicate with the audience. One example of Stuart's communicative intentions occurred in variation two, where a new triplet motive is featured in measures 11 to 12. Listening to his improvisation, he comments at that moment:

> S: See there, you're trying to express some tenderness; communicate with the person and with the audience. You're trying to say: look, this is what we all feel, and we can kind of all admit it together. (Source: Second hour, first improvisation performance, 23 July 2013).

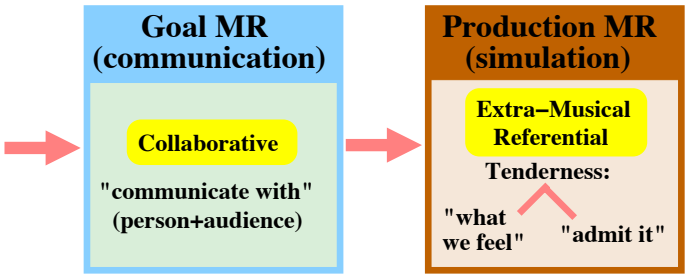


Figure 4.10: Stuart's mental representations during variation 2.

As figure 4.10 shows, Stuart's intentions evidence the presence of a communicative goal-based mental representation, where he constructed collaborative meanings from his reference to the audience. In order to make this possible, Stuart uses role-play through a simulation production-based mental representation, where creates the music by engaging in an imaginary dialogue with the audience. This imaginary dialogue evidences the construction of an extra-

musical meaning. In particular, Stuart assumes the role of the narrator and regards the audience as a character within his narrative.

The translation of Stuart's imaginary dialogue into musical expressions is particularly evident in variations five, six, and seven. Listening to his performance, Stuart points out these variations as a significant moment in his improvisation, in which he was focused on literally "talking" with the audience through the music.

> S: So this is just another level of depth really...and to say: look, I'm trying to say something here. There, it's a bit slower, and you're wanting to reiterate something, so you're saying: look, I'm trying to talk to you and I'm expressing an emotion. (Source: Second hour, first improvisation performance, 23 July 2013).

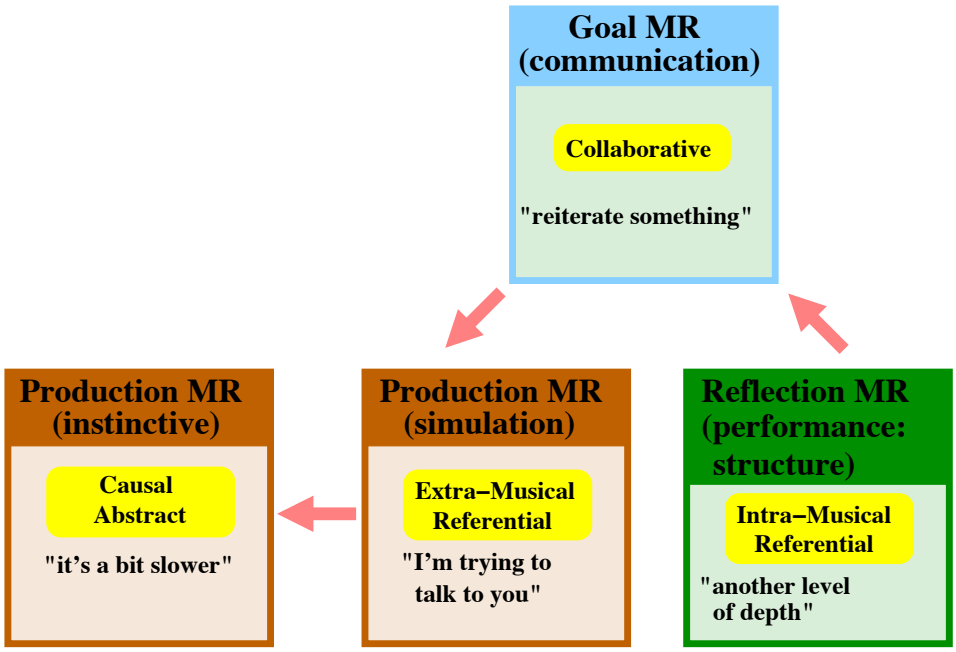


Figure 4.11: Stuart's mental representations during variations 5, 6, and 7

As figure 4.11 shows, Stuart's awareness of significant moments in his improvisation indicates the presence of a reflection-based mental representation where he was monitoring the musical structure of his performance. Stuart's references to these variations as "another level of depth" also evidence the construction of a referential (intra-musical) meaning. During these variations, Stuart's intentions of "reiterating something" to the audience shows the strong presence of a communicative goal-based mental representation and the construction of a collaborative meaning. Stuart implemented this communicative goal in two steps. First, he engaged in role-play through his simulation production-based mental representation,

continuing the imaginary dialogue of "trying to talk" to the audience and the construction of referential (extra-musical) meanings. To translate this imaginary dialogue into his performance, Stuart constructs causal meanings by imagining musical expressions that serve as metaphors for this dialogue, which is executed on the piano immediately through a type of instinctive production-based mental representation. In particular, Stuart's musical metaphor of reiterating a thought involves making the music "a bit slower". This is triangulated by the repetition, or reiteration, of several new ideas in a noticeably slower tempo throughout variations five, six, and seven (see Appendix A.1.5, A.1.6, and A.1.7).

Monitoring the audience successfully, however, also involves acknowledging the attention span of the listener. Variations nine, ten and eleven, provide a good example of where Stuart was especially mindful of keeping the audience engaged. In particular, these three variations, which stand out as the climax in Stuart's improvisation, feature dramatic changes in the dynamics, musical texture, and the reappearances of many ideas starting at the end of variation nine (see Appendix A.1.9, A.1.10 and A.1.11). Stuart explains his reason for introducing these changes in the music.

> S: See, that's the mixture of thinking: let's have a contrast (referring to the arpeggio runs) to keep the communication interesting, because if you think you're losing the person you're communicating with...
>
> F: Did you think you were losing me?
>
> S: Well, it's probably one of my traits of my style will be to vary quite a lot the contrast. So it probably will have been at first: well, let's change the course of this. And then thinking: back to the emotion, "I can fight this". And then that's when...you'd be thinking: "Well, I can fight this." So there's more energy, there's more volume, there's more thickness, and chords...(Source: Second hour, first improvisation performance, 23 July 2013).

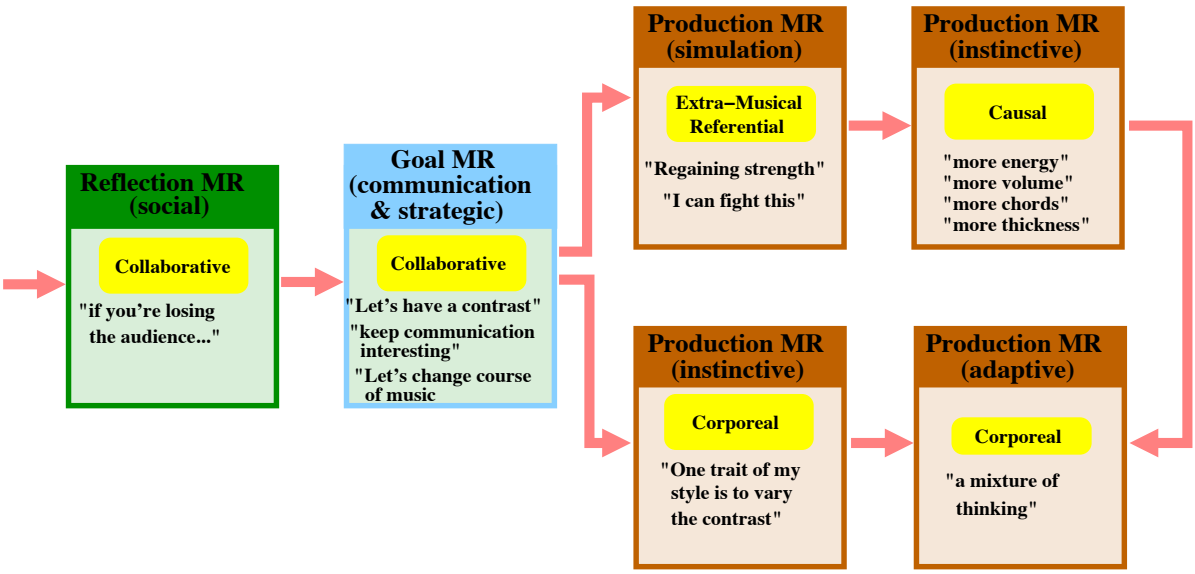


Figure 4.12: Stuart's mental representations during variations 9, 10 and 11

As figure 4.12 shows, a number of mental representations are present during these two variations, the majority of which are production-based. Due to the complexity of Stuart's intentions to resume his desire to communicate *and* his desire to introduce contrasts in order keep the audience engaged, it was necessary for Stuart to combine both communicative and strategic goal-based mental representations. Together, the combination of these two goals and the construction of a collaborative meaning provided Stuart with a plan comprising two implementation approaches. The first approach required Stuart to continue his imaginary dialogue and construction of referential (extra-musical) meanings through the use of role-play in his simulation production-based mental representation. This in turn, triggered Stuart's formation of an instinctive production-based representation, where he constructed of causal meanings by way of imagining and translating the dialogue into metaphors of musical expressions. The second approach involved Stuart's formation of another instinctive production-based representation, where he constructed more causal meanings by imagining different musical ideas or elements that produced a contrasting effect against the musical expressions of the imaginary dialogue.

To accommodate both approaches, Stuart uses a type of adaptive production-based mental representation, which results in what Stuart calls "a mixture of thinking" that merges both the simulation and instinctive production-based mental representations. In addition to the sudden contrasts in dynamics and texture compared to previous variations, Stuart's approach of switching between the imaginary emotional dialogue, and "changing the course of music", is

triangulated by the alternating appearances of two contrasting motives throughout variations nine to eleven. The first motive, which appears at the end of variation nine (mm. 65), is the new set of triplets that was first seen in variation two (see Section 4.4.3 and mm. 11-12 in Appendix A.1.2). The second motive, which appears twice in variation ten at mm. 68 and 70, is a sweeping arpeggio figure that was first seen in variation three (see Section 4.4.1 and mm. 17 in Appendix A.1.3). These two motives appear in alternating measures throughout the three variations, illustrating Stuart's "mixture of thinking".

As Stuart explains below, these activities between his various goal and production-based mental representations had occurred due to his awareness of the audience, which suggests that a type of social reflection-based mental representation had triggered the creation of these three variations.

> F: But how do you know if you're losing them? Because you're not talking while you're playing. What kind of energy do you feel, or is it something you feel yourself?
>
> S: The thing is they might not be giving off that energy, but you just know yourself that sometime after an 'X' amount of time, however much it's trying to say, there's a cut off point to where someone says: Yeah, well I've heard you talking about all of that...and it's the same thing with music really. I think it's like telling someone some story and after about 10 minutes they'll...hang themselves. They start to say: you know, I get the idea of that, do you know what I mean? And that's really – when you're playing music to an audience, you've got to be aware of them. (Source: Second hour, first improvisation performance, 23 July 2013).

It should be noted that the collaborative meaning in Stuart's social reflective-based mental representation was of an external type, where the audience acted as the driver that informed the changes in Stuart's communicative intentions. In this case, the audience had an indirect influence on the actual development of Stuart's improvisation, as he had decided to make changes based on what he thought the audience would want to hear.

To summarise this section, Stuart monitored his audience in two ways. First, he formed intentions to communicate by engaging in an imaginary dialogue. Second, he was mindful of the audience's attention span and sought to address it by using different production approaches to introduce contrasts into the music. These changes in the music can be seen in variations two, four, nine, ten, and eleven.

4.4.4 Monitoring the performance: referential, corporeal

In addition to monitoring the audience (see Section 4.4.3), Stuart was also engaged in monitoring his own performance throughout his improvisation. An example of Stuart's performance monitoring activity occurs in variation eight, which features the appearances of the new triplet motive that was first seen in variation two (see Section 4.4.3 and mm. 11-12 in Appendix A.1.2). Reflecting back on his performance, Stuart recalled his surprise at creating these motives during that moment, evidencing the presence of a reflection-based mental representation and the construction of a corporeal meaning.

> F: Did you have anything that came up as a surprise? To what extent did some of the things you've used were already familiar to you?
>
> S: Yeah! Probably that bit that went kind of a bit flippant, I wasn't really expecting it. I think it was in the middle and it sort of went...(plays the triplet development Section)
>
> (Source: Second hour, first improvisation performance, 23 July 2013).

That Stuart was not expecting these motives to appear also indicates the formation of an instinctive production-based mental representation at that moment. Coincidentally, while listening to his performance earlier, Stuart had also commented about the appearances of this new triplet motive in variation eight in relation to his intentions during the performance. In particular, Stuart's intentions indicated the presence of a strategic goal-based mental representation, where he constructed corporeal meanings from his enjoyment of the risk-taking experience.

> S: Sometimes, I just think I'll have a frivolous moment and try anything just to enjoy myself. (Source: Second hour, first improvisation performance, 23 July 2013).

Furthermore, Stuart's separate comments about variation eight suggests that these three mental representations are connected to the same event in his improvisation, as shown below in figure 4.13.

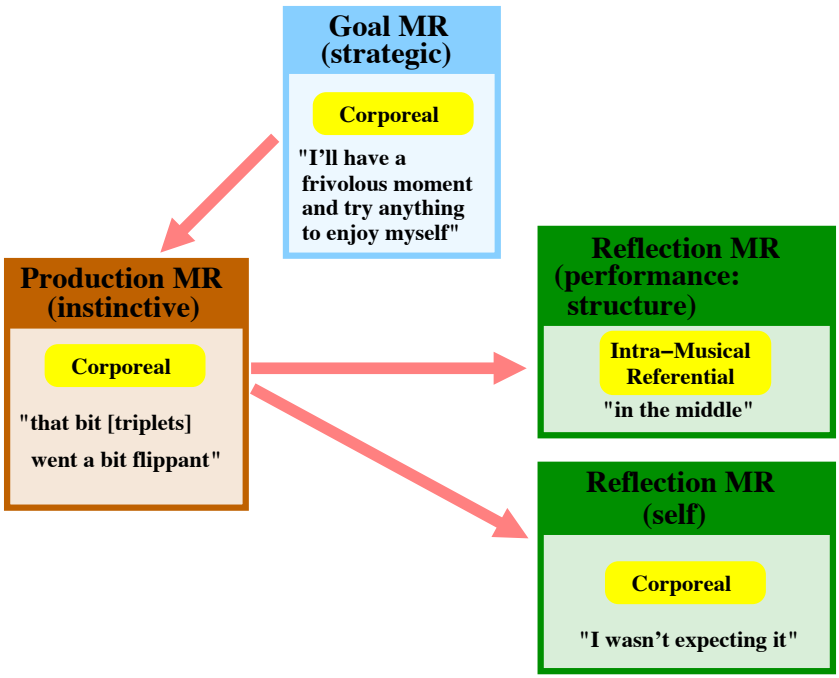


Figure 4.13: Stuart's mental representations during variation 8

As figure 4.13 shows, Stuart's strategic goal to engage in risk-taking was implemented through an instinctive type of production. The construction of Stuart's corporeal meaning in his production-based representation is evidenced by his description of playing the "flippant" triplets. This led to his surprise while monitoring his improvisation. Stuart's reactions demonstrate a formation of two types of reflection-based mental representations, where he was monitoring himself as well as his own performance. Thus, in addition to pointing out the location of the triplets, which evidences the construction of referential (intra-musical) meanings, Stuart also constructed corporeal meanings from his feelings of surprise. Stuart later elaborates on this unexpected experience.

> S: What happens is you get the inspiration, you get the adrenaline, and it's like something takes over you and does it on its own. It's the only way you can describe it. And what you find with improvising is, you almost take a step back and think: Oh, I think I'll just let my hands do this because I don't know what's happening, and they're doing it on their [own]..." so it's a bit stupid, doesn't it, and it sounds like some kind of fairy..."like yeah, like that really does happen." But actually that is the way improvisation [works] – when you're totally at one with the emotion, being relaxed, and you've got a – like you said – some kind of spur, making you do it. And that's when you start going: What am I doing? I don't normally do that. (Source: Second hour, first improvisation performance, 23 July 2013).

Here, Stuart describes a type of creator and witness phenomenon that is commonly cited in other improvisers' experiences. There are times, however, where Stuart reported a degree of

greater control he had in his performance. An example like this occurs in variation nine, where Stuart's improvisation returns to a major key, and the entire original first motive reappears in measure 58 (see Appendix A.1.9). According to Stuart, the modulation and especially the motive's return was an intentional decision.

> S: You see, I'm used to doing...well, when I've improvised a motif, even though it's only a few notes, it's stuck in my head, so then I will keep coming back to it. (Source: Second hour, first improvisation performance, 23 July 2013).

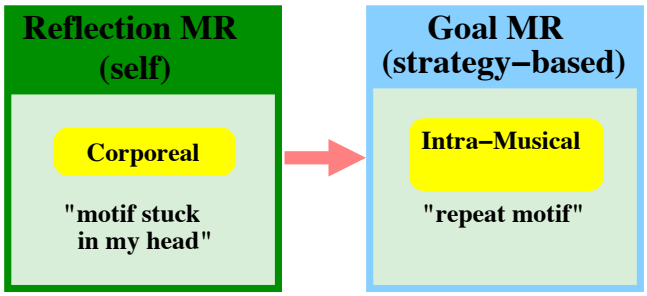


Figure 4.14: Stuart's mental representations during variation 9

As figure 4.14 shows, Stuart's awareness of the motive's influence in his thinking evidences the presence of a self-directed reflection-based mental representation at that moment. Having recognised and evaluated the persistence of this motive in his thinking, Stuart decides to feature it again, indicating the formation of a strategic goal-based representation. This strategic goal provided Stuart with a plan for inserting the motive in a particular location at variation nine, indicating the construction of a referential (intra-musical) meaning.

To summarise this section, included in Stuart's activity of monitoring the performance structure was his awareness of his own reactions and experiences to the music that was created. These included reactions of surprise, as well as expectation from the reappearances of certain musical motives in variations eight and nine.

4.4.5 Summary

To summarise, this section has presented Stuart's goal, production, and reflection-based mental representations that were formed during the activities of narrative-based scaffolding, establishing flow, monitoring the audience, and monitoring the performance. The formations of these mental representations involved the constructions of referential (intra and extra-musical), collaborative, causal, and corporeal meanings throughout Stuart's improvisation. In

the following page, figure 4.15 presents a summary of these mental representations and their interactions during Stuart's performance.

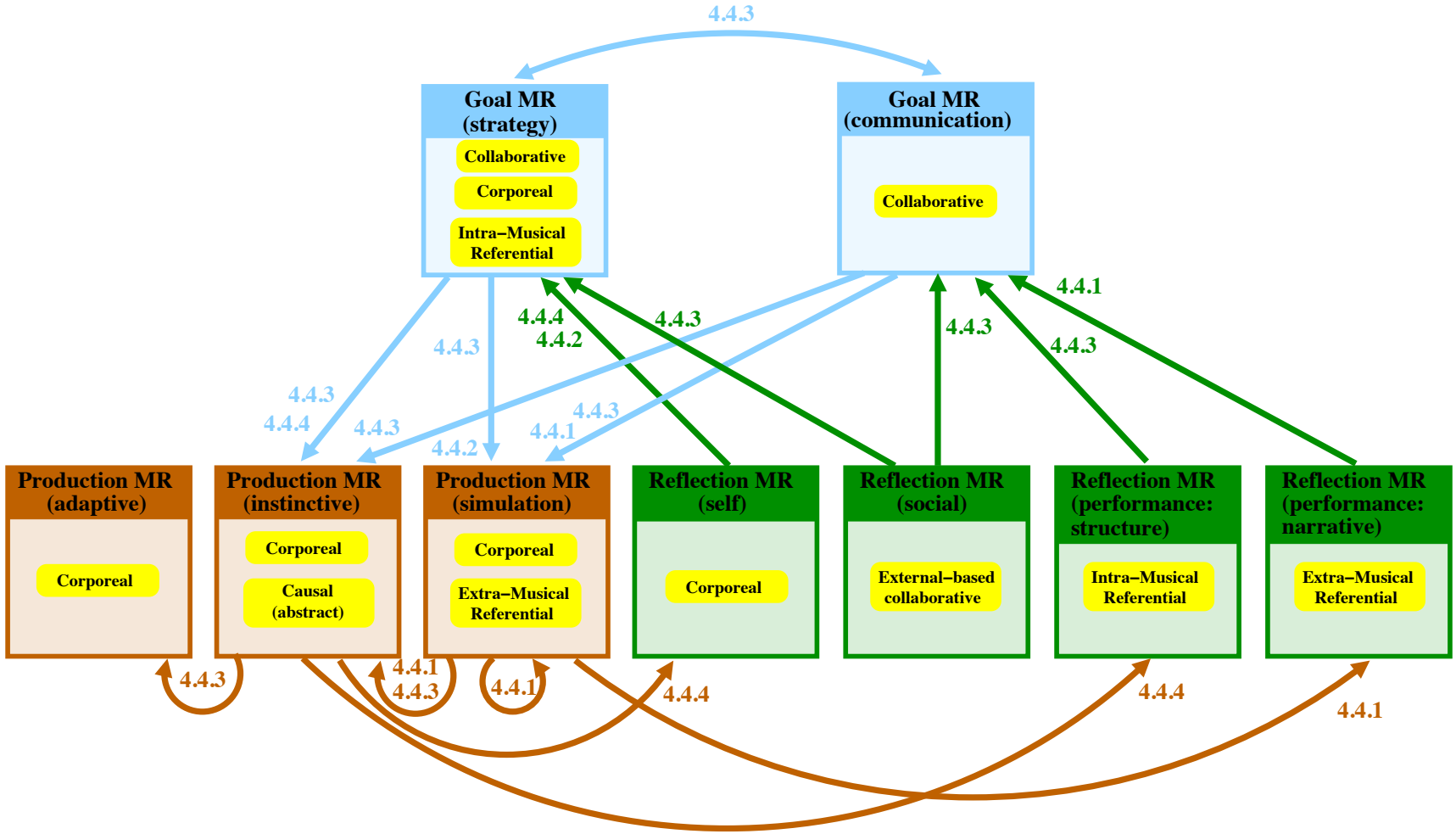


Figure 4.15: Summary of Stuart's mental representations in the improvisation phase

As figure 4.15 shows, Stuart's goal, production, and reflection-based mental representations have been arranged into a format that is adapted from Lehmann's (1997) model. The interactions between these mental representations are supported by references to the Sections in which they were presented. From this diagram, Stuart's mental representations during his improvisation is characterised by a significant amount of activity from his production-based mental representations, as shown by the large number of inputs and outputs in the brown coloured boxes. The higher number of green-coloured boxes, representing the different types of reflection-based mental representations that were present, also shows Stuart's use of feedback from a variety of sources. Lastly, Stuart's goal-based representations are shared between two types of strategic and communicative intentions that drive his improvisation.

4.5 Reflection: progressive reflection-based representations

Section 4.5 draws on two illustrations produced by Stuart to present his progressive reflection-based mental representations of the given musical stimulus, and of his own improvisation. The data that was used to analyse Stuart's drawings came from a semi-structured interview that was conducted after the performance of his improvisation[94]. These drawings were analysed using Elkoshi's (2002, 2004) MSC Method of analysis (see Sections 3.4.2 and 3.5.4).

4.5.1 Drawing of musical stimulus

This subsection presents the morphological, structural, and the conceptual analysis of Stuart's drawing of the musical stimulus in three parts. In the first part, the morphological analysis reveals two main components in the drawing. The second part, which presents the structural analysis, shows how the drawing corresponds to the musical stimulus from a right-to-left direction. Lastly, in the third part, the conceptual analysis presents the individual components of the drawing with the relevant parts of the musical stimulus. In the following figure, Stuart's drawing of the musical stimulus is shown.

[94] To refresh his memory, the musical stimulus was played for Stuart as he began the first drawing. Stuart initially found the task to be slightly difficult but was soon able to illustrate the music without having to use western music notation. While he was drawing, Stuart often spoke his thoughts aloud, hummed, or played parts of the stimulus on the piano, such as a left-hand chord or a part of the melody. This proved to be very useful for identifying the parts of the stimulus that Stuart was referring to in his drawing, which is shown in the following (see Section 4.1 for more details).

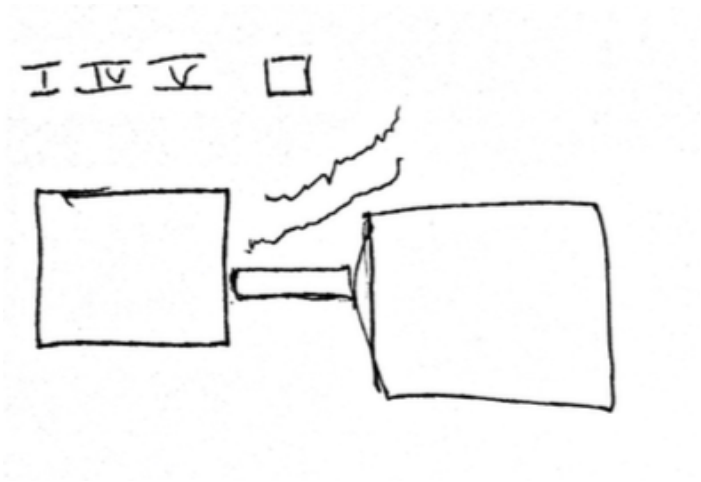


Figure 4.16: Stuart's drawing of the musical stimulus

Morphological analysis: representational, referential, causal

From a morphological viewpoint, Stuart's drawing primarily shows constructions of representational, referential, and causal meanings based on the musical stimulus. By examining the drawing in terms of its descriptive properties (e.g. shapes, size, spacing), we can see that Stuart has drawn three geometric shapes: two squares and a rectangle in between them. Two parallel wavy lines are positioned on top of the rectangle. The two squares are proportionally much larger than the rectangle, which is relatively small and thin. The reappearances of these squares and lines indicate repetition of common elements, thus evidencing Stuart's constructions of a referential (intra-musical) meaning. At the top there is a very small square with three Roman numeral letters (I, IV, V) labeled next to it. These Roman numeral letters, which indicates a formalised understanding of the harmony, evidences Stuart's construction of his representational meaning. Moreover, Stuart explained how the small square represented the primary chords of western music.

Box 4.14: Observation of Stuart drawing the musical stimulus, part 1

S: To me, it's a standard I-IV-V harmonic progression. But how would I sort of write that...very simplistic, obviously. Light, nothing too heavy...Put that into an illustration...Well, at the moment I'll just put the first things I'd thought, which was I-IV-V…Simplicity of it, really. I mean, I've just drawn a square, just a standard square there because I think, well, that's something that's fairly – it's in a box, isn't it really? (hums)...three chords, it's the obvious primary chords of western music, it's all totally in a box.

F: And the box represents...?

S: A very standard chord progression. You know, the most primary westernized chord progression.

(Source: Second hour, first improvisation performance, 23 July 2013).

The square, then, functions as a key to interpret the larger geometric shapes below it. Recalling how Stuart had learned the musical stimulus completely by ear (see Section 4.2), his immediate identification of the chords confirmed how strong his aural skills are. Stuart's explanation revealed a tendency to focus on the harmonic component of the stimulus, even though he had been observed to mostly hum the melody while he was doing the drawing. This also suggests that to a certain extent Stuart might have already been familiar with the melody. Furthermore, the three boxes (e.g. the two squares and one rectangle) illustrate Stuart's construction of causal meanings of the harmonic structure. In particular, the block-like shapes of these boxes reflect Stuart's reference to the sound texture of the 'three [blocked] chords', as well as the activity-based agent required (e.g. block-like topography) to produce it on the piano. Moreover, Stuart had constructed referential (extra-musical) associations of 'lightness' and 'simplicity' to these chords, indicating that he has ascribed positive qualities to these 'basic', 'standard' and 'obvious' sounds. Stuart's metaphorical descriptions of these chords being 'totally in a box' also suggest that these chords are fundamental sounds that he often encounters as a musician.

Structural analysis: corporeal, representational, referential

From a structural viewpoint, Stuart's drawing primarily shows his constructions of corporeal and referential (intra and extra-musical) meanings of the musical stimulus, as well as further a development of his representational meanings (see the morphological analysis). By examining the structure of the drawing in terms of its organisational strategies (e.g. grouping, symmetry,

directionality, proportion, etc.), Stuart's representational meaning is explicitly unpacked in terms of the relationship between the shapes and what each shape represents. As a whole, Stuart's drawing of the stimulus appears quite symmetrically, due to the position of the two squares flanking the smaller rectangle. Recalling that these squares represented primary chords, their positioning and large sizes suggests that Stuart perceives the I-IV-V chord progression to be a very significant component of the harmony in the musical stimulus. Stuart further explained what the wavy lines represented and why the size of the rectangle is smaller.

Box 4.15: Observation of Stuart drawing the musical stimulus, part 2

S: So...(sings part of phrase 3)...I'd probably say a box, a square, then with a...(hums again)...a few little nuances of...something sweeter really. So I'd probably say that it's mainly a square box but with some kind of sweetness coming from it…There's a few minors creeping in so I'd just do a...(plays a soft chord in LH) it's very tricky isn't it, but we did say a rectangle, there's a slight variation with a minor coming in there. And then I suppose just a very predictable ending, so another square probably.

F: So it's a very predictable beginning with a very predictable ending, a typical I-IV-V-I?

S: Yeah, with just a little bit of a cheekiness in the middle.

(Source: Second hour, first improvisation performance, 23 July 2013).

As Stuart had explained, the small size and positioning of the rectangle is attributed to the relatively few (only two) minor chords that appeared towards the middle of "Answer Me". It appears, then, that Stuart used the shapes of the squares and rectangle to represent major and minor tonalities respectively, and that their sizes are proportional to the frequency of occurrence for each kind of tonality. Stuart referred to the rectangle as "a slight variation" from the square, which evidences the construction of referential (intra-musical) meaning through the recognition of similar components. To an extent, the use of a rectangle suggests that Stuart had also perceived the minor chords to be "standard".

In addition, Stuart's explanation of his drawing also evidences his construction of a referential (extra-musical) meaning of the musical stimulus. In the ideation phase, Stuart's previous extra-musical meanings (associations of 'lightness' and 'simplicity') had focused on the general characteristics of the I-IV-V chord progression in relation to the western music genre (see Section 4.3). However, in his drawing, Stuart's extra-musical meanings (e.g. associations

to nuances of ‘sweetness’, ‘square box’, and ‘cheekiness’) have become more distinctive in terms of the detailed qualities he had ascribed to particular sounds in the musical stimulus.

Furthermore, the structural analysis showed Stuart’s construction of corporeal meanings in terms of the temporal dimension of the musical stimulus. In particular, Stuart’s chronological listing of the shapes (e.g. a square, followed by a rectangle with wavy lines (nuances of sweetness), and ending with another square) revealed that his drawing is organised from left to right. As such, Stuart’s reference to this directionality brings a temporal dimension into his drawing. This means that the drawing is a blueprint that represents Stuart’s perception of a chronology of specific sound events, which in turn, was created from his perceived experience of learning and playing through the musical stimulus on the piano.

Conceptual analysis: corporeal, causal

From a conceptual view, Stuart’s drawing primarily shows his constructions of corporeal, referential (intra-musical, and causal meanings. In particular, the drawing is explicitly defined in terms of how each component (e.g. square, rectangle, wavy lines) corresponds to the sound events in the musical stimulus. When interpreted from a left-to-right directionality, Stuart’s corporeal meanings of the harmonic sequence emerge from the drawing: the musical stimulus begins with a very standard harmony (square), with slight variations and a few minor chords in the middle (rectangle), and concludes with a predictable ending (square). The pattern matching of the squares with the major harmonies evidence the construction of referential (intra-musical) meanings. Based on the chronological appearances of the major and minor chords in the musical stimulus, each geometric shape from the drawing can thus be assigned to a specific part of the musical stimulus, as is shown in the following three tables.

Table 4.1: Drawing of square with excerpt of first motive.

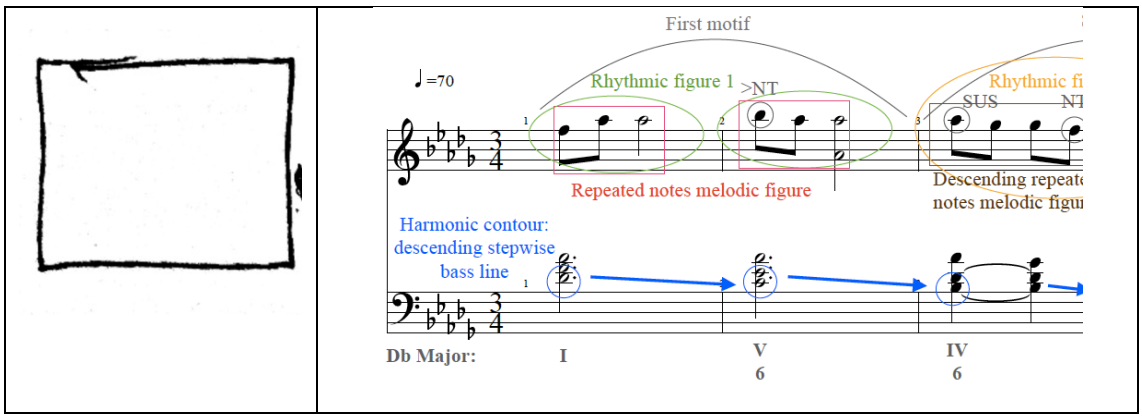


Table 4.2: Drawings of shapes and lines with excerpt of second and third motive.

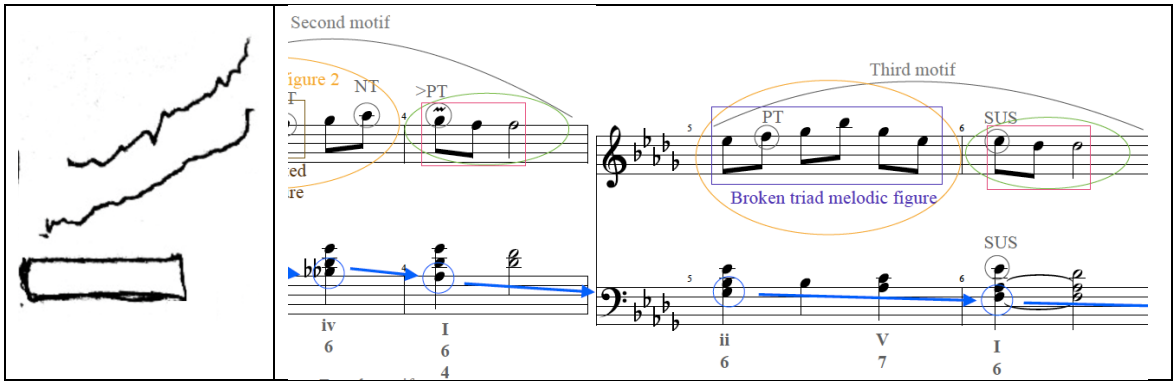
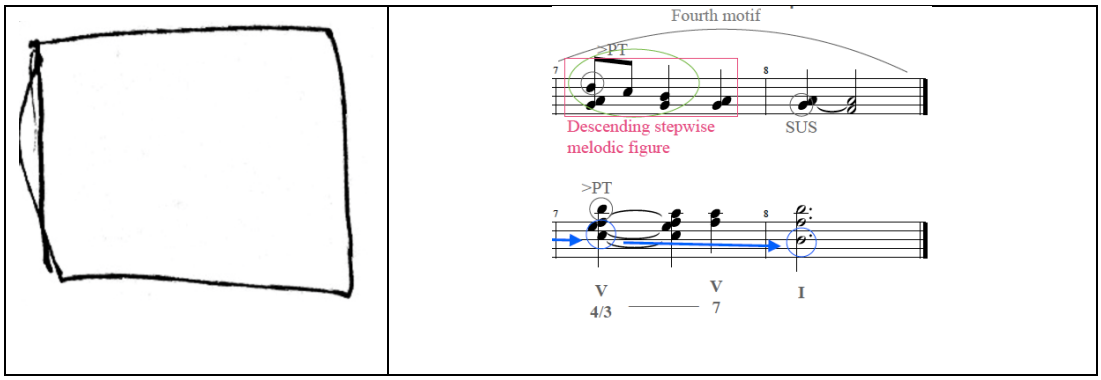


Table 4.3: Drawing of square with excerpt of the fourth motive.



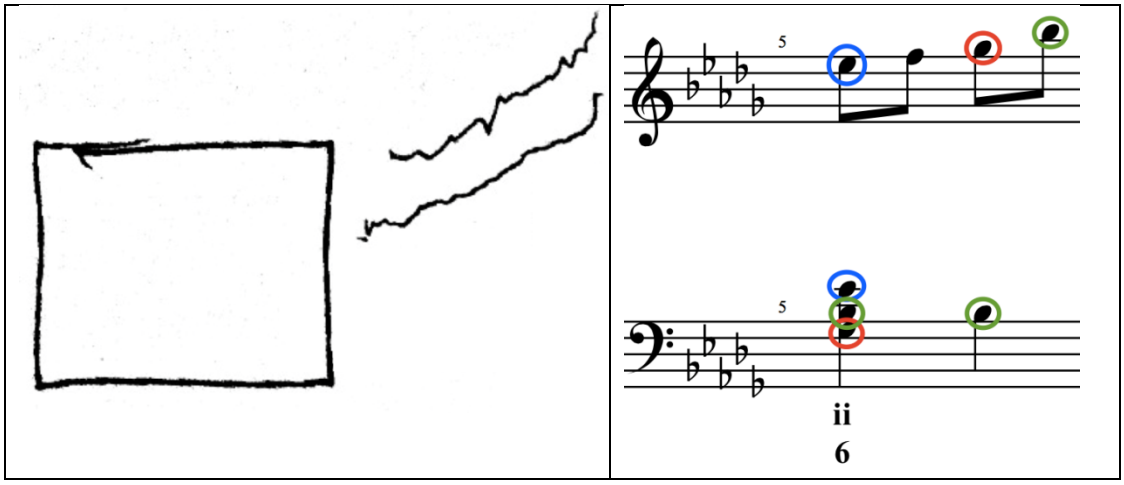
The construction of Stuart's corporeal meanings is evidenced by the proportional length of the major and minor chords, which are represented by the sizes of the shapes in the drawing. For instance, the small size of the rectangle reflects the fleeting appearances of the minor iv and ii chords in measures 3 and 5 respectively, while the two larger squares reflect the dominant presence of major chords in the musical stimulus.

On the other hand, Stuart's causal meanings are evidenced by the depiction of the imagined sound textures of chords and melodic lines, which are shown in the drawing through the distinction between blocked geometric shapes and thin wavy lines. In particular, it is proposed that the thin wavy lines represent the melodic component of the musical stimulus. At first glance, there appears to be a discrepancy between Stuart's explanation of the wavy lines and their located position in his drawing. Stuart had described the wavy lines as a "kind of sweetness" coming from the first square. As was pointed out earlier, Stuart was observed to

be singing the third melodic motif while drawing the wavy lines, suggesting that they represented an aspect of the melody where the notes would correspond to the I-IV-V chords. However, the third melodic motif in the music stimulus features a prominent minor ii chord (see Section 4.4), which suggests that the wavy lines might also correspond to the rectangle. This is supported by the fact that the wavy lines are positioned directly over the rectangle, which Stuart referred to as a "slight variation" of a few minor chords "creeping in". Recalling the musical analysis of the stimulus in Section 3.5.2, two minor chords (b-iv and ii in measures 3 and 5) do appear to "creep in" between the I and V chords towards the middle of the theme, as shown previously in Table 4.16.

Additionally, a closer examination of the third melodic motif reveals that the first four melodic notes appear to match almost completely with the notes in the ii chord. The topography of the notation also appears to correspond closely with Stuart's drawing, as is shown in the following table.

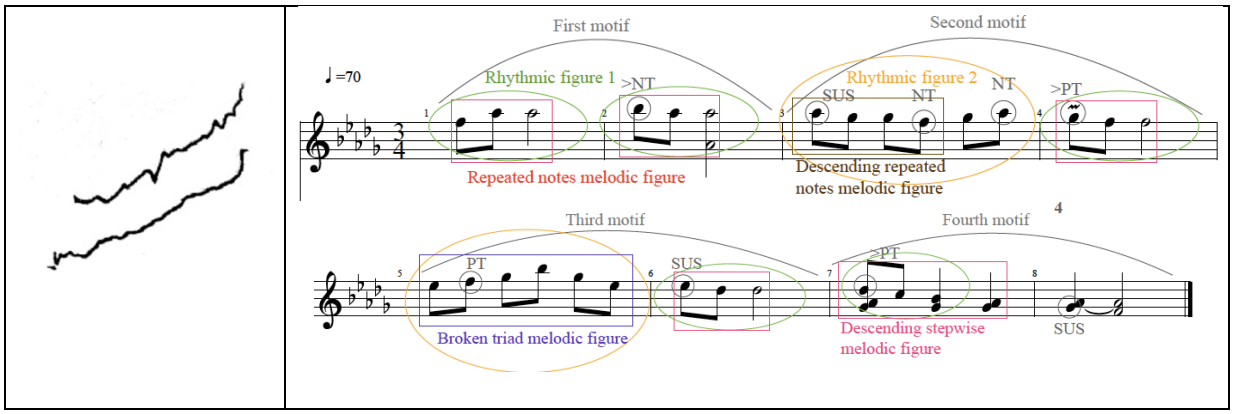
Table 4.4: Drawing of square and line with excerpt of the third motive.



Thus far, I have shown that the wavy lines might not correspond only with a few melodic notes associated with the I-IV-V chords (left square) as Stuart had described, but also to the minor melodic notes (the rectangle). At this point, it is argued that these lines may represent the entire melody of the musical stimulus due to several reasons. First, the location of the lines can be interpreted ambiguously as a secondary component emanating from the left square, or as an individual unit with the rectangle. It is worth noting that a part of the lines are also positioned over the right square, possibly indicating another spatial relationship between these two components. Second, the structures of the lines are thin, long, and stretched out,

which appear to reflect visually the sonic texture of a high-range and mostly step-wise melody, as well as its graphic depiction in western music notation. A similar phenomenon can be observed with the geometric shapes appearing to correspond with the sonic textures of blocked chords in the musical stimulus. Third, the appearance of not one, but two lines that are drawn in parallel to each other also suggests they may represent the entire melody of the musical stimulus in two long phrases, with each phrase being four measures long, as is shown in the following table. Lastly, the relatively small size of these lines in proportion to the squares suggests a likelihood of Stuart being familiar with the melody and subsequently devoting more attention towards reflecting on the harmony, as was discussed earlier (see Table 4.4).

Table 4.5: Drawing of abstract lines with excerpts of all four motives.



Finally, when Stuart's drawing of the stimulus is examined again as a whole (see Figure 4.16), the two squares and the rectangle appear to descend very slightly and gradually in the right direction. Their arrangement appears to reflect the descending step-wise harmony that runs throughout the musical stimulus (see Section 3.5.2). Additionally, the right square is slightly larger than the left square. When this is considered together with the musical analysis, it can be seen that the blocked chords from the beginning have descended stepwise by a whole octave towards the end of the harmonic progression in the musical stimulus (see Section 3.5.2). This suggests that the size of the squares may also be proportional to the range of the chord progression, with higher-ranged chords represented by the smaller square, and lower-ranged chords represented by the larger square. Thus, the drawing represents Stuart's causal meaning of the musical stimulus that comprises the imagination of separate melodic and harmonic components, their distinct sound textures, and sonic patterns featuring a general descent of pitches. The above elements in Stuart's causal meanings are represented in the

drawing by blocked shapes, thin lines, and the descending shift over the entire drawing when viewed from left to right.

Bringing this conceptual subsection and thus, the final part of the MSC analysis to a close, Stuart's drawing of the musical stimulus falls into the MSC categories of association, formal response, and growth (see Section 3.5.4). Each category also corresponds to the different types of meanings that Stuart had constructed. First, the presence of metaphorical shapes and lines in the drawing showed the use of association and the construction of referential (extra-musical) meanings. Second, the chronological representation of sound events (e.g. appearance, order and proportions of the shapes) in Stuart's drawing showed a formal response as well as the construction of corporeal meanings. Third, the representation of contrasting tonalities (e.g. square and rectangles) and sound textures (e.g. blocked shapes and thin lines) in the drawing demonstrated growth and the construction of causal and representational meanings. Figure 4.17 below shows a summary of the conceptual analysis of Stuart's drawing, in terms of the relationships between the drawn components and the musical stimulus.

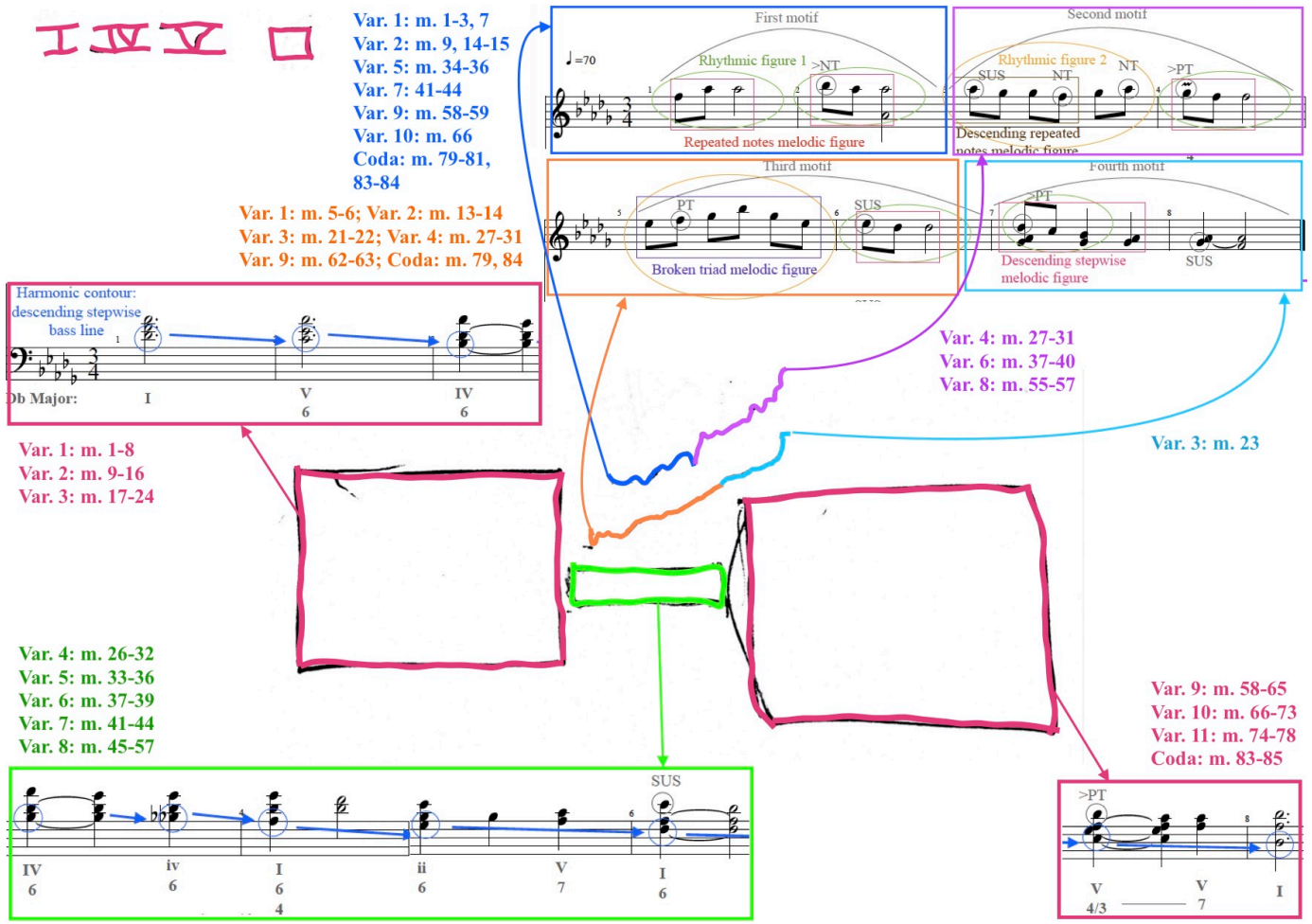


Figure 4.17: Summary of conceptual analysis (Stuart's musical stimulus drawing)

Figure 4.17 above shows an annotated version of Stuart's entire drawing together with the transcribed excerpts of the musical stimulus. In particular, the melodic motives are mapped above the abstract lines, while the harmonic progressions are mapped below and to the left of the square shapes. In addition, the color-coded arrows from each component points to the corresponding parts in the melody and the harmony of the musical stimulus, which were drawn from the analysis, presented earlier in tables 4.1 to 4.5.

Lastly, the colour-coding and the measure numbers show how each part of the musical stimulus (and their drawn representations, as indicated by the arrows) are featured in Stuart's improvisation and his drawing of it (see figure 4.19). In particular, the colour-coded measure numbers refer to how each of the corresponding parts from the musical stimulus is featured in Stuart's improvisation, as well as how they are represented in Stuart's drawing of his improvisation. Meanwhile, the squares (coded in red), the rectangle (coded in green), the first piece of the upper abstract line (coded in dark blue), the second piece of the upper abstract line (coded in purple), the first piece of the lower abstract line (coded in orange), and the second piece of the lower abstract line (coded in light blue), show how Stuart's drawings of the musical stimulus and his improvisation are related. Figure 4.17, then, shows that the major harmony and the first and third motives from the musical stimulus are featured much more often in Stuart's improvisation, in comparison to, for example, the fourth motive. The multiple relationships between the musical stimulus and Stuart's improvisation, as well as both of his drawings will be discussed further in Section 4.5.2, and presented in figure 4.19.

4.5.2 Drawing of improvisation

This subsection focuses on Stuart's progressive reflection-based mental representation of his improvisation, drawing from the analysis of the illustration he had produced after his performance. In the following, a morphological, structural, and conceptual analysis of Stuart's drawing of his improvisation is presented in three parts. The first part presents a morphological analysis revealing twelve components in the drawing. This is followed by a structural analysis that reveals a left-to-right directionality in the drawing. Lastly, the conceptual analysis shows how each of the twelve components in Stuart's drawing corresponds to his improvisation. In the following figure, Stuart's drawing of his improvisation is shown.

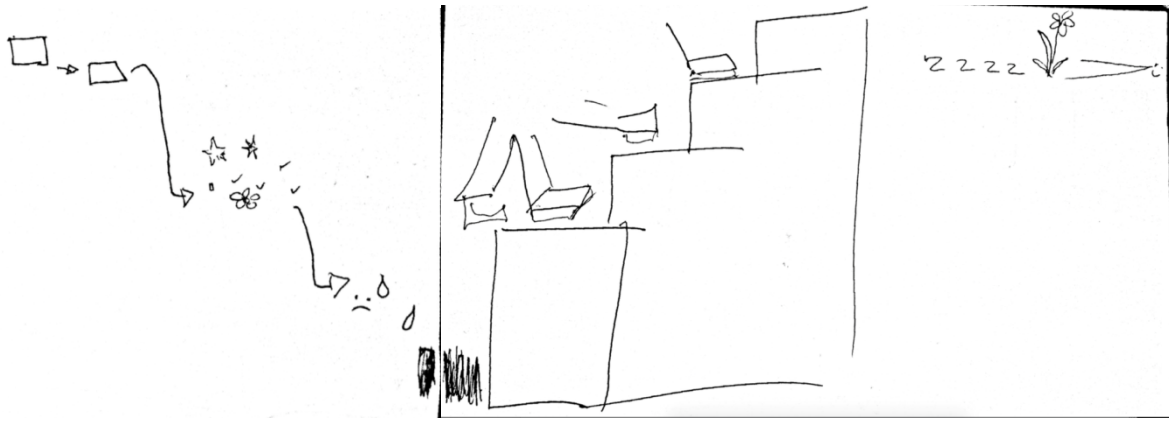


Figure 4.18: Stuart's drawing of his improvisation on the musical stimulus.

Morphological analysis: referential

From a morphological viewpoint, Stuart's drawing shows his constructions of referential (extra and intra-musical) meanings. By examining the drawing in terms of its descriptive properties (e.g. shapes, size, spacing), Stuart's drawing comprises two different geometric and abstract shapes, five icons, and four symbols. Two geometric shapes, a square and a rectangle, are located on the left part of the drawing. At the bottom of the drawing there are also two dark abstract shapes; the dark shape on the right appears as a black box. The repetition of these shapes suggests Stuart's recognition of similar components, thus evidencing his construction of intra-musical meanings.

In addition, the drawing features five icons, all of which are representations of recognizable objects in real life. Four of the icons appear twice in Stuart's drawing: flowers, teardrops, stars, and facial expressions, evidencing Stuart's construction of extra-musical meanings. Two flowers are located on opposite sides of the drawing; one flower is on the left, and a second more detailed flower is on the far right. Similarly two facial expressions, a happy face and a sad face, are also located far apart: the sad face is on the left, and the happy face is on the far right. Furthermore, two star icons appear near the first flower, followed by two more teardrop icons underneath it. Lastly, the most prominent icon in the drawing is a pair of legs walking up a staircase located at the center.

Stuart also used four symbols, which are representations of ideas and feelings that requires knowledge to understand their meanings. On the left side are three arrows of different lengths and sizes. In between two of the arrows, a group of four checkmarks comprise another symbol. At the far right are two more symbols: a sequence of four 'Z's (an onomatopoeia imitating the sound of sleeping) and a music decrescendo symbol (representing the gradual decrease of dynamic levels).

These different types of signs (icons, symbols) and shapes found in Stuart's drawing show evidence of several referential (extra and intra-musical) meaning in his progressive reflection-based mental representation of his improvisation. The use of different signs and shapes also indicate that these meanings may comprise visual (flowers and teardrops), emotional (happy and sad faces), and conceptual (shapes, checkmarks, and decrescendo), and physical (walking up the stairs and sleeping) modalities.

Structural analysis: representational, causal, referential, corporeal

From a structural viewpoint, Stuart's drawings show his constructions of representational, causal, referential and corporeal meanings of his improvisation. By examining the structure of the drawing in terms of its organisational strategies (e.g. grouping, symmetry, directionality, proportion, etc.), Stuart's representational meaning in terms of his understanding of the improvisation's structure is explicitly unpacked in terms of the relationship between the shapes and what each of them signifies. As a whole, Stuart's drawing of his improvisation forms a large 'V' shape. The focal point of the drawing is the two dark abstract shapes that make up the bottom of the 'V'. On the left side, the three arrows indicate that Stuart's drawing is arranged in a left-to-right linear direction, which evidence Stuart's construction of corporeal meaning in terms of its chronological depiction of sound events. In particular, Stuart had referred to the square on the far left as his starting point.

Box 4.16: Observation of Stuart drawing his improvisation

> S: The thing is, it's supposed to be simplistic, isn't it? Because that is what it is. This is simplistic; it's just that. Now you do something with it. So I suppose you would say there's a box that you were given. So you use that to start with anyway…you could put an arrow to say that perhaps there is a little bit of variation in the bass. (Source: Second hour, first improvisation performance, 23 July 2013).

Recalling back to Section 6.4.1, Stuart's drawing of the stimulus had used a similar square to represent the primary chords (I-IV-V) in western music (see Section 6.4.1), which evidences

the construction of a referential (intra-musical) meaning. Stuart's comment, then, revealed that he was focused mostly on the original harmonic progression when he began to improvise. In his drawing, this intra-musical meaning is developed further, as evidenced by how the square is followed by a short small arrow and then a slightly longer rectangle, indicating small changes in the harmony. However, after the rectangle a much longer arrow appears with a downward direction, leading to a cluster of symbols (checkmarks), shapes (stars), and an icon (flower). Stuart revealed that the cluster of symbols, shapes, and icon reflected how his focus shifted from harmonies to romantic thoughts while he was improvising.

> S: Obviously, that's just theirs (pointing to his drawing of the original stimulus). Square box, slight variation. Then I said: a bit deeper, romantic, stars...into just thoughts there. So, kind of romantic and sort of, love, beauty, light, nothing dripping or hanging on there. (Source: Second hour, first improvisation performance, 23 July 2013).

For Stuart, these romantic thoughts comprised several qualities including notions of love, beauty, and light, showing his constructions of referential (extra-musical) meanings. Each quality that Stuart had referred to also appears to correspond to the individual objects in the cluster. For example, the flower represents beauty, the stars represent light, and the checkmarks signify that everything is all right with nothing negative "dripping or hanging on there". Another long downward arrow appears next to the right side of the cluster, leading to a component with two icons: a sad face and two teardrops. The lower-right teardrop is then followed by two dark abstract shapes, which are positioned at the lowest part of the drawing. Stuart explained that this new component reflected how his focus had shifted again to more intense negative emotions.

> S: Here, down to a deeper [level] – couple of tears. I mean I've just done that...anxiety, blackness (pointing to the black abstract shape)...I didn't go too deep, actually, in that one did I? But it would have gone darker...so, darker, and thinking: I can't sustain this. (Source: Second hour, first improvisation performance, 23 July 2013).

By this point, the arrows in Stuart's drawing have appeared in three different lengths, sizes, and positions. The appearance of each arrow indicates a change in Stuart's mode of thinking, while the longer and larger arrowheads correspond to Stuart's thoughts that have evolved from the original stimulus. This observation is supported by the use of long arrows between very different objects, while a short arrow appears between similar objects (e.g. such as the first two boxes, where Stuart was thinking about the original harmony and its variations). Additionally, groupings of particular objects are indicated by their descending positions in the

drawing. In particular, there is evidence to suggest that the sad face, the teardrops, and the dark abstract shapes are separate components, despite the lack of an arrow between them. This point will be discussed later in the conceptual analysis.

In addition, Stuart explained that the larger abstract shape represented anxiety that "would have gone darker", indicating the presence of another mode of thought – the notion of new musical possibilities yet to be realized, not in this improvisation but perhaps another one. The descending positions of the objects also reflect how Stuart had associated his negative feelings of anxiety and darkness with a physical dimension of going downwards.

Following the lowest point in Stuart's drawing, the rest of the objects on the right side of the abstract shapes changes direction and begin to ascend. Arrows are no longer used. Stuart drew an animation to demonstrate how "and then, that positive thing has kicked in there: so it's all right, I can do this...up the steps..." Proportionally, the animation is the largest component in Stuart's drawing. Similarly, the act of climbing stairs suggests that Stuart had associated his feelings of courage in conquering challenges and determination with physical strength, a larger size, and going upwards. Stuart also elaborates about the details of the animation.

> F: What's this? (F points to the stairs in S's drawing)
>
> S: Sorry, those are (laughs)...those are supposed to be feet walking up, actually (S goes over that part of the drawing with his pen)...you know, square shoes, I don't know why they're square shoes....
>
> F: Could it be because you started with squares in the beginning?
>
> S: Yeah, yeah!
>
> (Source: Second hour, first improvisation performance, 23 July 2013).

The animation takes the drawing to the highest point of the page, where the last few objects stop ascending and level off to a plateau. Stuart explained how these last objects represented a sequence of thoughts.

> S: And then here: comfortable (gestures towards end of drawing)…I've put a few Z's there...comfortable...I suppose that is just saying that you've actually conquered that, and that now you're comfortable with the fact that that's happened, and that you can actually continue to blossom again without being dragged down by this (pointing to the black box). And then just tailing off to a resolution that's a peaceful one; you know, you've

come through something. (Source: Second hour, first improvisation performance, 23 July 2013).

Specifically, four different thoughts can be identified from the sequence, showing more evidence of extra-musical meanings that Stuart had constructed. Each thought also corresponded with the last four objects on the right end of the drawing. The first thought, 'feeling comfortable', has been translated into the onomatopoeia sound of sleeping. For the second thought, the drawing of the flower directly reflected the metaphor of 'blossoming again'. The notion of '*tailing off* to a resolution' is illustrated by a decrescendo, the first musical symbol that was used in Stuart's drawing. Lastly, the happy face is a literal representation of positive emotions from the thoughts of 'peace' and 'coming through something'. Interestingly, Stuart's drawn representations for the first and third thoughts comprised aural dimensions (e.g. 'zzzz's and a decrescendo), while the second and the last thoughts comprised visual and emotional dimensions (e.g. a flower and a happy face).

Structurally, the left-to-right direction of the separate components in Stuart's drawing indicates that his meanings were constructed in a chronological sequence. Additionally, the components that included different objects, such as the cluster of symbols (checkmarks), shapes (stars), and icon (flower) suggest that Stuart's meanings comprised several modalities. Furthermore, the drawing of the square indicated that Stuart's meanings at the beginning of his improvisation was mainly conceptual as he was thinking about the harmony of the musical stimulus, which he used started with and used throughout the rest of his improvisation.

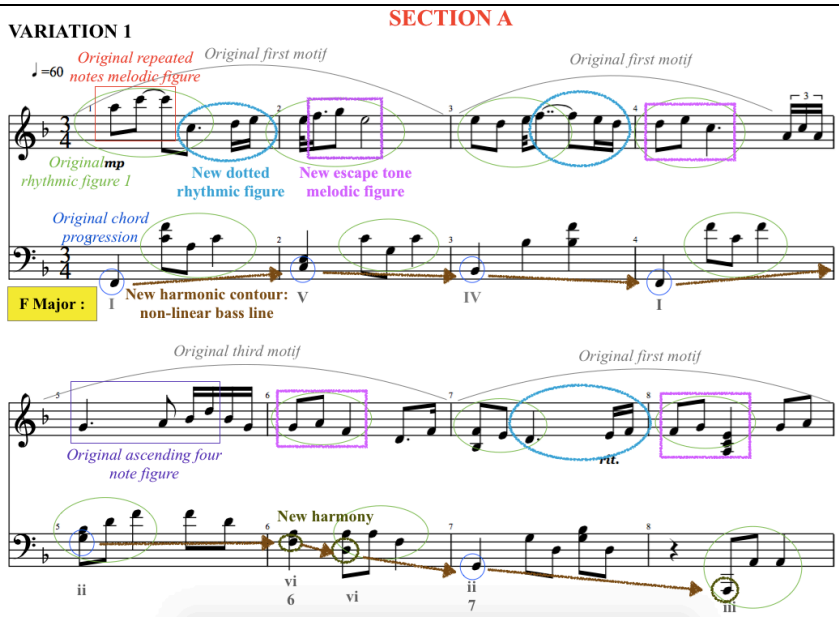
Conceptual analysis: referential, corporeal, causal

From a conceptual viewpoint, Stuart's drawing shows the presence of referential (intra and extra-musical), corporeal, causal meanings. When interpreted from a left-to-right directionality, Stuart's corporeal meanings of the harmonic sequence emerge from the drawing: the musical stimulus begins with a very standard harmony (square), with slight variations and a few minor chords in the middle (rectangle), and concludes with a predictable ending (square). Based on the chronological appearances of the major and minor chords in the musical stimulus, each geometric shape from the drawing can thus be assigned to a specific part of the musical stimulus, as is shown in the following three tables.

The first component is identified by the square on the far left from Stuart's drawing. Earlier,

Stuart had referred to the square as 'a box that you were given, so you use that to start with anyway.' A small arrow indicating ‘a little bit of variation in the bass’ then followed the square, which represented the I-IV-V western music chords from the original stimulus. Stuart’s comment, then, strongly suggests that the square and the arrow correspond to the first variation, as shown in the table below.

Table 4.6: Drawing of first component, Stuart’s comments, and variation 1

<table>
<tr>
<td> 
“Now you do something with it…there's a box that you were given. So you use that to start with anyway…you could put an arrow to say that perhaps there is a little bit of variation in the bass.”</td>
<td> 
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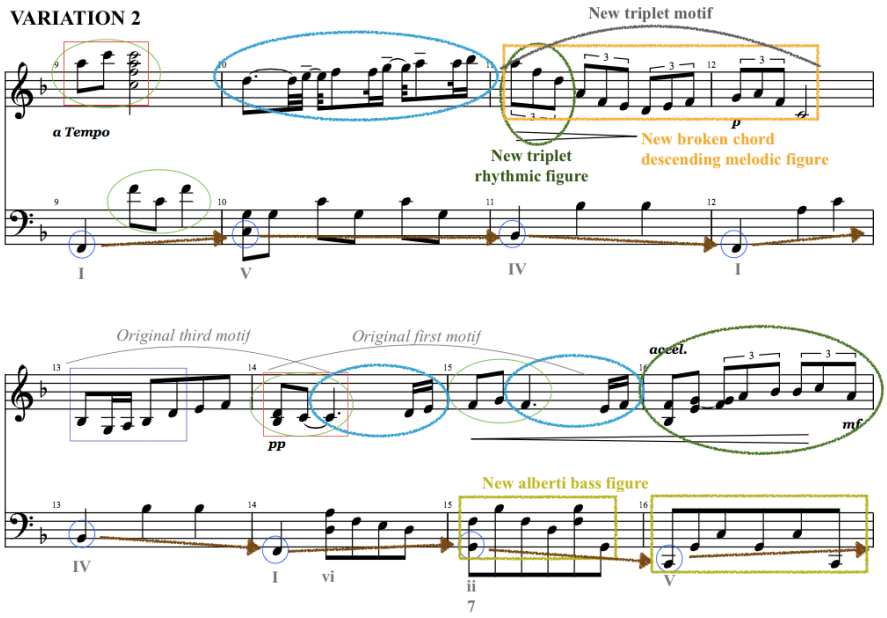
In the first variation, the original harmonic progression is very similar to the original stimulus apart from the last three chords (ii-vi-iii) in measures 6 to 8. A new 'angular' harmonic contour (brown arrows) had also replaced the original descending stepwise bass line. In addition to a similar harmony as the square had indicated, variation one is also melodically similar to the original stimulus, featuring many original melodic (red squares) and rhythmic figures (green circles) from the first and third motifs. During this moment, however, Stuart was also consciously expressing feelings of tenderness to the audience. The square and arrow are constructions of referential (intra-musical) meanings as evidenced by their depiction of the harmonic variation in the improvisation.

The second component in Stuart’s drawing is the rectangle, which is located next to the small arrow. Stuart regarded the rectangle as a 'slight variation' of the 'square box'. His comment, “obviously, that's just theirs” reaffirmed that the square is a component that was borrowed

from the original stimulus. The location of the rectangle and its similar shape and size to the square suggests that it corresponded with variation two, as is shown in the following table.

Table 4.7: Drawing of second component, Stuart's comments, and variation 2

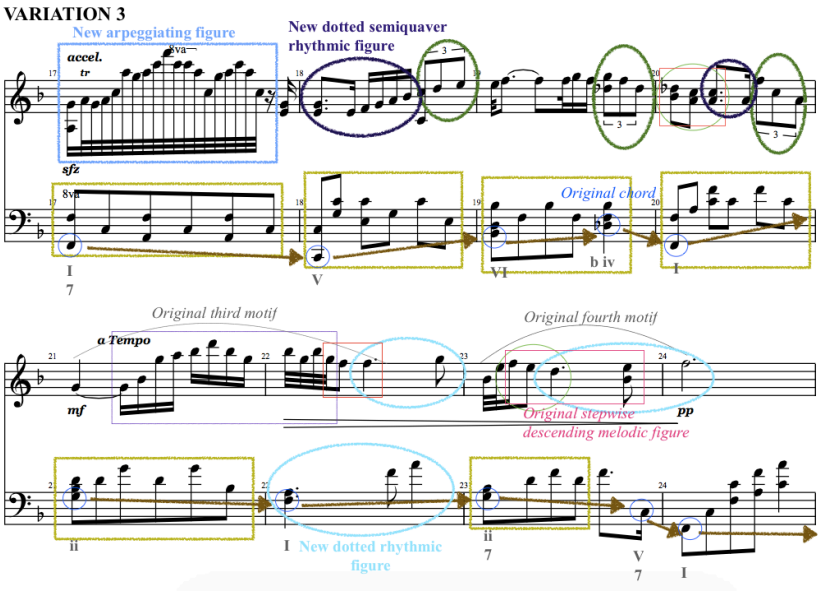
 **"Square box, slight variation."**	

In variation two, both the original harmonic progression and its angular bass line are retained. Apart from minor changes including a new melodic figure (orange rectangle), new rhythmic figures (green and teal circles), and a new accompaniment figure (gold rectangle), variation two is very similar to the musical texture, dynamics, and harmonic structure in variation one. Like the square, the rectangle also reflects intra-musical meanings by its depiction of the variation in the harmony.

The third component, which follows the rectangle, is identified by another arrow leading to the cluster of stars, checkmarks, and a flower. Stuart had described this component to be "a bit deeper", shown by the long arrow pointing downwards to the much lower location of the cluster. He further elaborated that the cluster represented thoughts of 'romance', 'stars', 'love', 'beauty', and 'light'. These qualities appear to be reflected in variation three, where the musical expression intensifies significantly. The following table shows the third component and the third variation together.

Table 4.8: Drawing of third component, Stuart's comments, and variation 2

"A bit deeper, romantic, stars...into just thoughts there. So…romantic and…love, beauty, light, nothing dripping or hanging on there."

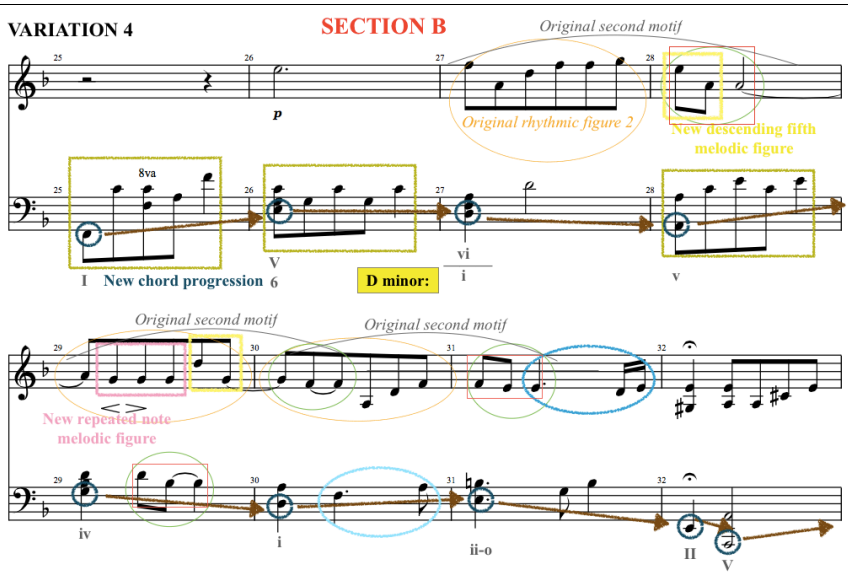


In this variation, Stuart's emotional expression during his improvisation was also more assertive. Stuart described this moment as getting "a surge of: I can do this, I can do it!" (See Section 4.4.1). Variation three reflects this pattern of thought, opening with a *sforzando* over a rapid four-octave arpeggio. In particular, the rapid high notes in an accelerated tempo seem to portray the glittering sound texture of 'light' and 'stars'. Measures 18 to 24 appear to convey the qualities of romance, love, and beauty; the musical tension in the rhythmically varied melody is heightened by the first appearance of the minor iv chord in m. 19, and the large dynamic contrast from *mf* to *pp*. Stuart also pointed out the thicker accompaniment texture in this variation, explaining how this emotional assertiveness "gives you more impetus to do some deep chordal [passages]…" Furthermore, the F major tonality maintains a positive mood in this variation, emphasising Stuart's remark that the component represented "nothing dripping or hanging on there. " The multiple different objects in the third component, then, reflects the substantial changes in variation three. In particular, these depictions of the emotions, and a thicker musical texture evidence the constructions of extra-musical and causal.

A shorter descending arrow pointing to a sad facial expression defines the fourth component. Stuart had described this component as going "down to a deeper [level]." This deeper level and the descending arrow are implied in variation four, where F major modulates down into D minor as shown in the table below.

Table 4.9: Drawing of fourth component, Stuart's comments, and variation 4

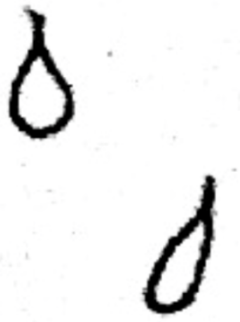
"Here, down to a deeper [level]."



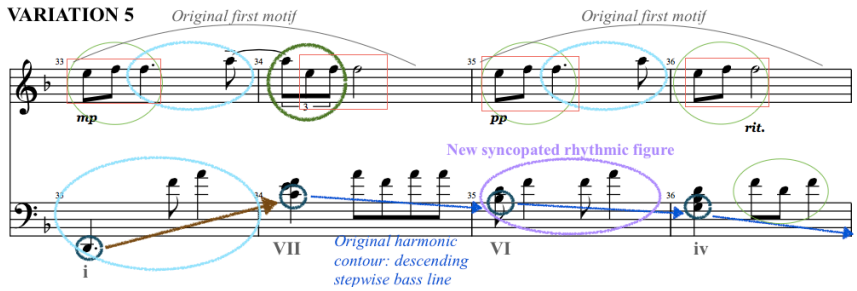
In Section 4.4.3, Stuart had referred to this moment as "another level of depth" where he was "trying to say something." His comment suggests that variation four is the start of a new Section where important changes are introduced. Variation four is indeed significantly different from the first three variations, where the F major key conveyed Stuart's associations of beauty, tenderness, love, and other positive qualities. In particular, the D minor key and the slower rhythmic movement in this variation alludes to Stuart's description of how the romance is "mixed with some hurt." The first appearance of a minor tonality in variation four also coincides with the first appearance of a direct emotional representation (e.g. sad expression) in the fourth component of Stuart's drawing, evidencing the construction of an extra-musical meaning.

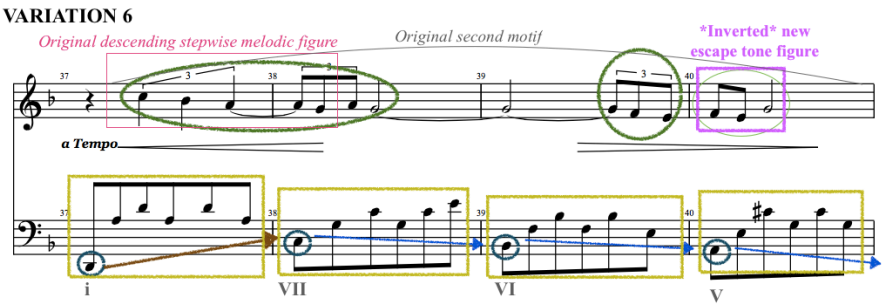
The fifth component comprises the two objects next to the sad expression, which Stuart had defined as "a couple of tears." Although the teardrops are positioned slightly lower, they do not yet occupy the lowest point of the drawing. The double appearances of the teardrops and their specific locations suggest that they represent a sequence of rising action events that are distinct yet similar. These indications appear to correspond with the musical characteristics of variations five, six, and seven, as is shown below.

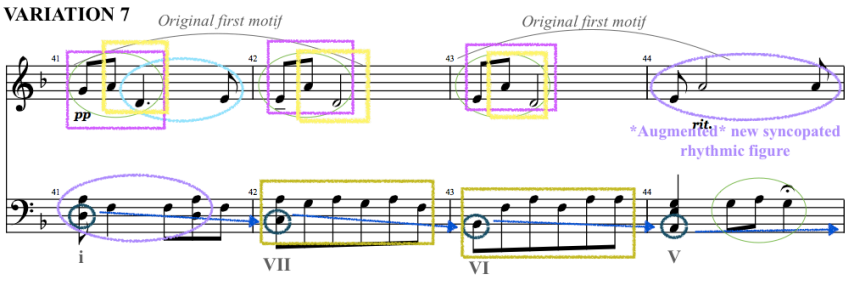
Table 4.10: Drawing of fifth component, Stuart's comments, and variations 5, 6, 7



"A couple of tears."





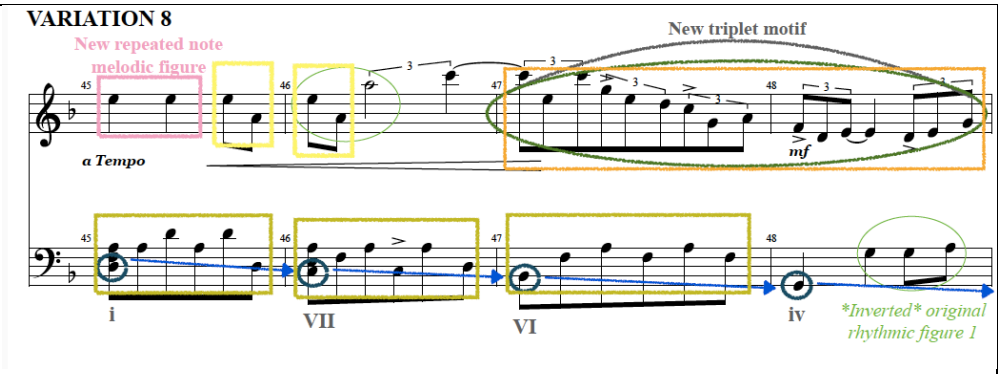


As the table above shows, variations five, six, and seven are twice shorter than the first four variations. All of these variations also feature a slower tempo, soft dynamics, a new idea, and the repetition of that idea. Stuart's reflections during this moment in the audio-playback support these observations, where he had noted, "there, it's a bit slower, and you're wanting to reiterate something." In measures 36 to 44, *ritardando* is indicated several times in measures 36 and 44. Furthermore, the two teardrops also seem to convey Stuart's need to 'reiterate something'. In particular, these teardrops appear to correspond with the repetition of several ideas across all three variations, indicated by the reappearance of the same coloured circles. As such, the fifth component shows evidence of extra and intra-musical meanings, as well as corporeal meanings through depictions of a descending pitch change.

Additionally, the musical intention behind these melodic repetitions seem to convey Stuart's emotional urgency: "you're saying: look, I'm trying to talk to you and I'm expressing an emotion" (see Section 4.4.3). Stuart had also remarked: "then it would have gone to that, sort of the absolute…" suggesting that these three variations are building towards a climatic event. The harmonic tension of the unresolved chord progression is also heightened throughout each variation. This sense of anticipation seems to be reflected in the accumulating harmonic tension and the gradual descent of each teardrop in the drawing.

Next, the thinner dark abstract shape beside the teardrops defines the sixth component in Stuart's drawing. The sixth component is the first time in Stuart's drawing where a different depth of colour and a less obviously identifiable object can be seen. According to Stuart, the first abstract shape represented "anxiety" and "blackness". Similarly, Stuart had also described variation eight as "hardly being able to drag yourself off the floor." Variation eight, which is shown next to component six in the table below, is one of the most intensive moments in Stuart's improvisation. Opening with a sequence of new melodic figures (pink and yellow boxes), the repetition of the high 'e' note emphasizes the bold dissonance created against the d minor chord. In measures 45 to 46, the swift intervallic leaps of fifths and octaves rapidly widen the melodic range, further heightening the musical tension.

Table 4.11: Drawing of sixth component, Stuart's comments, and variation 8 (part 1)

 **"Anxiety, blackness."** "…hardly being able to drag yourself off the floor…"	 *"You could be starting to spiral down, and it's starting to lose the niceties."*

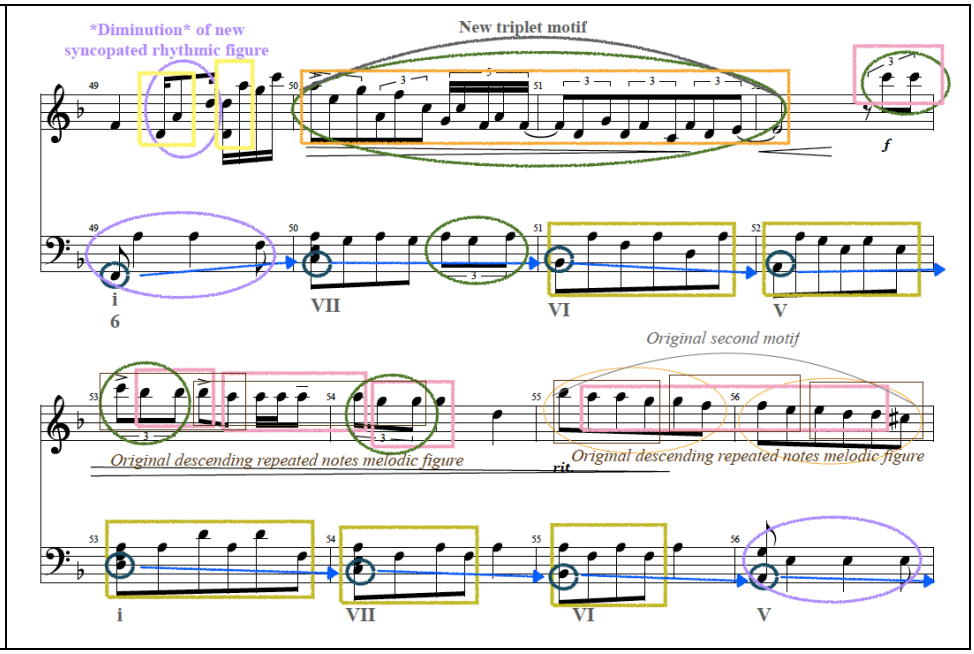
A sudden rhythmic drive, created by a sequence of accelerating cascading triplets in measure 47 seems to convey Stuart's feeling of "starting to spiral down, and it's starting to lose the niceties." Together, the downward direction from the descending melodic fifth melodic figure

(yellow box), the cascading triplet motif (orange box), the descending bass line (blue arrows), and the gradual crescendo create a sense of heaviness. Stuart's descriptions of "blackness", "spiralling down", and "hardly being able to drag yourself off the floor" are reflected in this dark abstract shape, which expresses the hidden multi-modal complexities of Stuart's extreme negative emotions. The sixth component, then, shows evidence of Stuart's extra-musical and causal meanings through its depictions of darker emotions and tonalities.

Stuart then described the larger dark abstract shape as representing something "darker", which helped to identify it as the seventh component in his drawing. This negative association, which was also present in Stuart's last description, indicates that the large abstract shape is a continuation of the thinner abstract shape. It appears, then, that the sixth and seventh components are closely linked. The visual similarity between the two components also suggest that the larger abstract shape corresponds to the remaining part of variation eight, which is the longest variation in Stuart's improvisation (see Appendix A.1.8). Table 4.12 below shows the second part of variation eight that corresponds to the larger dark abstract shape in Stuart's drawing.

Table 4.12: Drawing of seventh component, Stuart's comments, and variation 8 (part 2)

"Darker, and thinking: I can't sustain this."



The intensity from the first part of variation eight continues into measures 49 to 51, where the same melodic figures reappear in a more elaborate form. Following the reiterative emphasis of the cascading triplets in measures 50 to 51, the repeated melodic note figure (pink boxes)

returns as a bold descending sequence embellished with different rhythmic figures. Starting at a high 'c' in measure 52, its *forte* re-entry and rhythmic drive amplifies the emotional urgency that had been building since variation 5, showing how Stuart's feeling of darkness is about to reach a breaking point: "I can't sustain this." The position of the large abstract shape at the lowest point of the drawing reflects this climatic point in Stuart's improvisation where his most intense negative emotions were portrayed, showing Stuart's construction of extra-musical meanings.

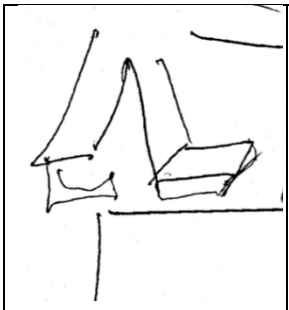
Following this climatic point, both the tempo and the dynamic level start to gradually decrease at measure 55, leading to a dissipation of the musical tension. The end of variation eight allude to Stuart's description of still feeling hopeful during this moment: "But still kind of thinking of the romance and trying to tell that person that: "here's the feelings and I want you to hear them," in the hope that it will improve that sort of loss." In measures 56 to 57, the appearance of A major chords anticipates a modulation into D major, suggesting that a new musical direction is taking place. The juxtaposition between the large abstract shape and the higher location of the next component in Stuart's drawing also reflects this anticipation of D major.

Furthermore, Stuart noted that playing the cascading triplet figures in variation eight (m. 47-48 and m. 50-51) marked a point in his improvisation where he was able to let go completely. He remarked: "Sometimes, I just think I'll have a frivolous moment and try anything just to enjoy myself" (see Section 4.4.4). To an extent, Stuart's drawing of the abstract shapes in the sixth and seventh components reflects this sense of liberation. In comparison to previous components, where recognizable objects such as the square, the flower, and the teardrops were neatly drawn, the irregularity and jaggedness of the abstract shapes appear to be more uninhibited in their execution, showing evidence of corporeal meanings.

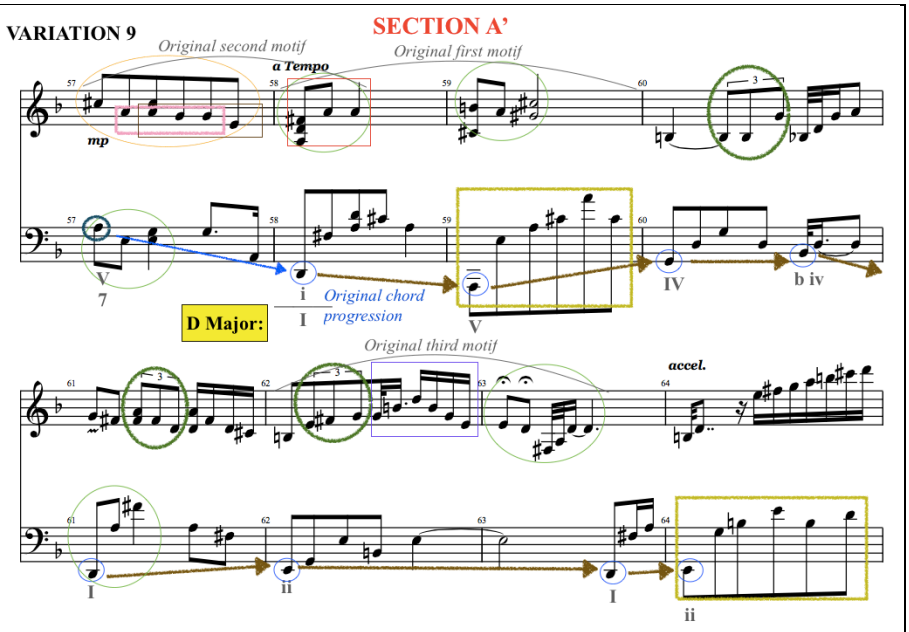
The eighth component identified in Stuart's drawing is a pair of legs standing on a staircase. Stuart associated this part with a positive quality that contrasted with the darkness of the previous component: "And then, that positive thing has kicked in here." The eighth component towers over all of the previous components in its size and location, as though emphasizing on this positive change. Moreover, Stuart's description resonates with his similar feeling of "regaining strength" in variation nine (see Section 4.4.3), suggesting a

correspondence with variation eight. The table below shows the eighth component together with the ninth variation.

Table 4.13: Drawing of eighth component, Stuart's comments, and variation 9



"And then, that positive thing has kicked in here: so it's all right, I can do this."

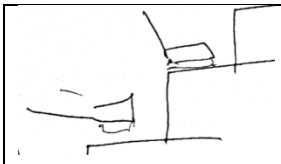


In measure 58, the harmonic tension since variation five finally resolves into D major, alluding to Stuart's decisive shift to focus on positive feelings: "it's all right, I can do this." In particular, the bright tonality of D major seems to convey Stuart's feelings of "regaining strength." This is sense of strength is also portrayed by the standing legs in the drawing. The minor to major modulation also highlights the distinct contrast between the smaller size and lower position of the seventh component, and the much larger and higher position of the eighth component. Additionally, Stuart had pointed out the restatement of the original first motif (red box, green circles), explaining that "when I've improvised a motif, even though it's only a few notes, it's stuck in my head, so then I will keep coming back to it" (see Section 4.4.4). Similarly, the feet and the staircase in the eighth component also reflect this return to familiar and recognizable objects following the two abstract shapes. In particular, Stuart noted that he had drawn "square shoes, I don't know why they're square shoes." (see Appendix E). The square shoes suggest that there is a connection between the eighth component and the first component, both of which contain a square. Both components also corresponded with the appearances of the first original motif in variations one and nine. As such, the content, shape, size, and location of the eighth component evidences Stuart's constructions of intra-musical, extra-musical, causal, and corporeal meanings through its depictions of positive emotions,

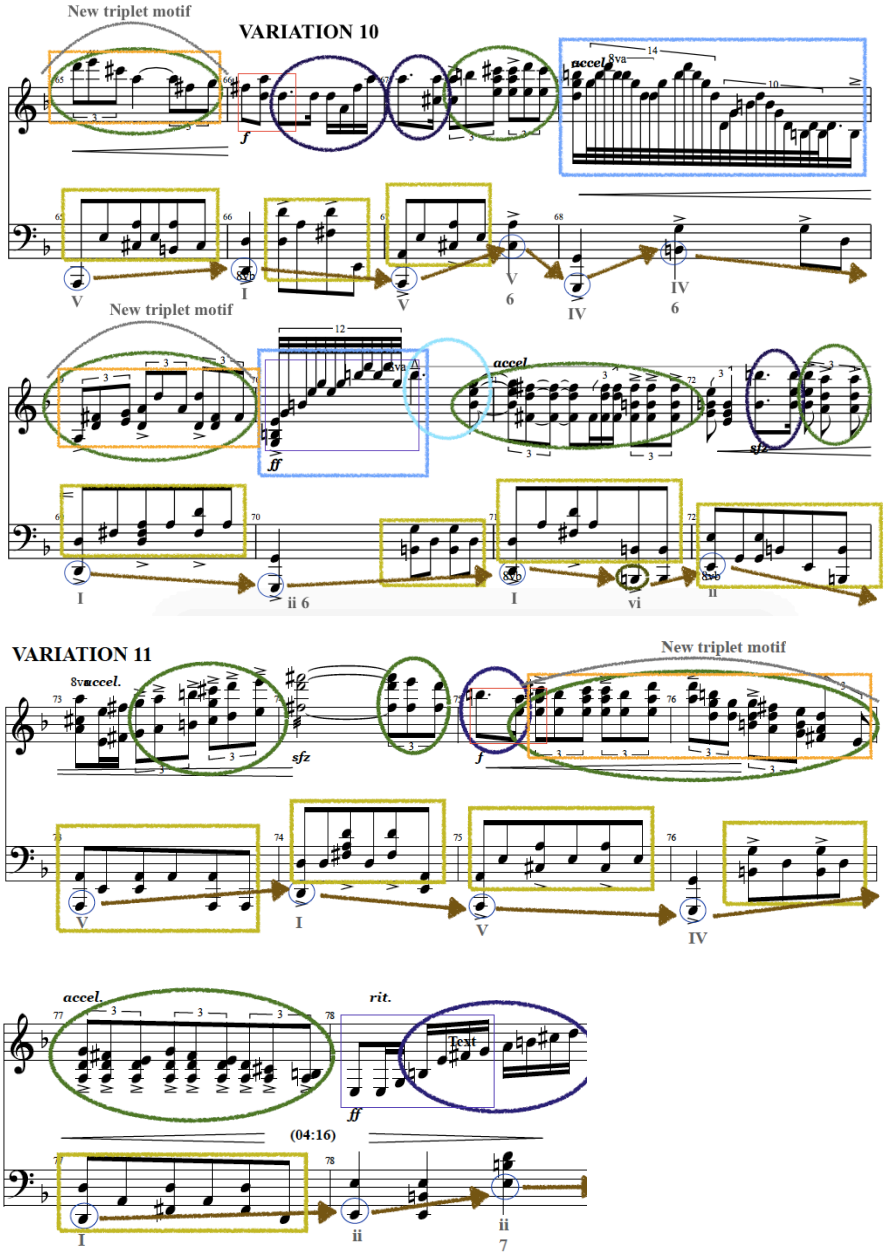
similarity in major tonalities, thicker chord texture, dramatic increase in dynamics, and ascending pitches.

Stuart described the next part of his drawing as going “up the steps”, which identified the feet climbing the two staircases as the ninth component. Although this component also featured feet and staircases, it is the first time in Stuart’s drawing where a physical action is depicted. Like the eighth component, the size of the ninth component is also multiple times larger than the previous components in Stuart’s drawing. The action-oriented characteristics in component nine appear to correspond with variations ten and eleven, which feature a wide range of contrasts in dynamics, pitch range, and musical texture. Of variation ten and eleven, Stuart had explained how “that's the mixture of thinking: let's have a contrast to keep the communication interesting.” He further noted that “it’s probably one of my traits of my style will be to vary quite a lot the contrast,” a trait that is also present in his drawing through the use of contrasting shapes and sizes of multiple objects. The following table shows how the ninth component corresponds with variations ten and eleven from Stuart’s improvisation.

Table 4.14: Drawing of ninth component, Stuart's comments, and variation 10 and 11



"Up the steps." (Stuart later elaborates: those are supposed to be feet walking up, actually…you know, square shoes, I don't know why they're square shoes...")



Most notably, the music throughout variations ten and eleven continuously alternates between the triplets figure (green circle), the dotted rhythmic figure (purple box), and the arpeggio figure (blue box). Stuart explained that these alternations indicated a shift in his thoughts during that moment: "it probably will have been at first: well, let's change the course of this. And then thinking: back to the emotion, "I can fight this." (see Section 4.4.3). Similarly, in component nine, the changing positions of the feet and the multiple staircases seem to reflect this constant shift between different thoughts. These rapid musical changes, which occur in

almost every measure, also create a strong sense of forward motion reminiscent of the climbing action depicted in component nine, along with four occurrences of sudden tempo accelerations (m. 68, 71, 73, and 77). As such, the ninth component shows evidence of corporeal, causal, intra and extra-musical meanings.

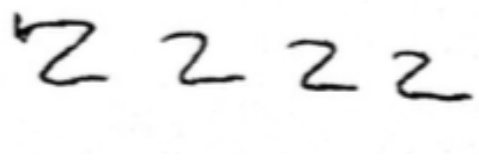
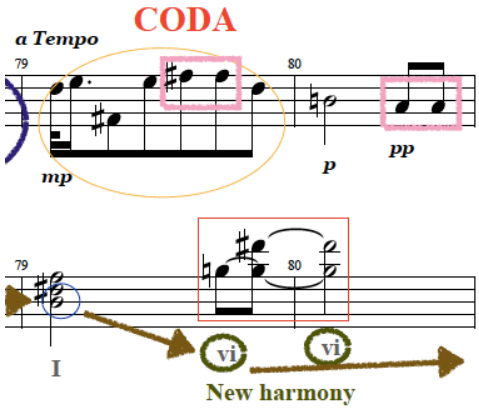
Throughout these two variations, Stuart frequently returned to focus on emotional thoughts after creating a musical contrast, in particular "thinking: I can fight this, you know, either way, I can fight what happens…" According to Stuart, these emotional thoughts manifested into the music both aurally and physically: "so there's more energy, there's more volume, there's more thickness, and chords." Indeed, the ninth component's large size appears to correspond with the loud dynamic level and the widening range on the piano in these two variations. Dynamically, variations ten and eleven both feature a fortissimo (*ff*) in measures 70 and 78, with the second time being the conclusive climax and the loudest moment in Stuart's improvisation. In measure 66, the dominant melodic line starts at an f-sharp and gradually rises throughout until it reaches an octave above in measure 74. The culminating climatic point is achieved when the melody descends to the 'e' below middle c in measure 78, establishing it as the lowest melodic note in the whole improvisation. This widening melodic range is further enlarged by the appearance of two rapid arpeggio figures in measures 68 and 70, both of which cover a span of four octaves, and is reflected in the ninth component's highest position and large size in the drawing, evidencing Stuart's corporeal and causal meaning constructions.

Following the two largest components, the remaining objects on the far right side in Stuart's drawing are once again located back at the top of the page. All of them have also decreased to a smaller size like the first seven components. Based on Stuart's descriptions, three distinct components can be identified from these remaining objects. Likewise, the coda, as the remaining part in Stuart's improvisation, also comprises three distinct phrases that appear to correspond with these identified components. Grouping together similar melodic contours and accompaniment textures helped to identify these three phrases, while the fermatas were used to indicate phrase lengths.

The tenth component, then, is a sequence of four 'Z's, which Stuart explained as "comfortable": "I've put a few Z's there…comfortable. You've actually conquered that, and you're comfortable with the fact that that's happened." Similarly, Stuart referred to the first

phrase of the coda as "the bit where I thought: I can fight this and get through it…then I just thought: Yeah, okay, I've got the drive to carry on, so that's dealt with" (see Section 4.4.1). In both cases, Stuart expressed the feelings of coming to terms with his previous struggles, suggesting a correspondence between the tenth component and the first phrase from the coda, as is shown in the table below.

Table 4.15: Drawing of tenth component, Stuart's comments, and the coda (part 1)

 **"Comfortable…I've put a few Z's there…comfortable. You've actually conquered that, and you're comfortable with the fact that that's happened."**	

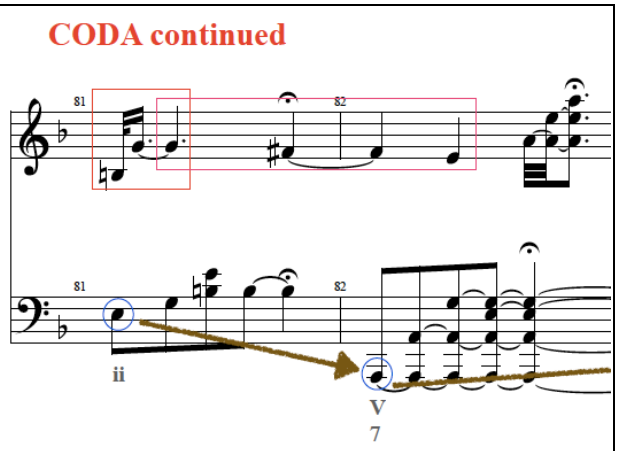
This moment, which follows immediately after the main climatic point, comprises a two-bar phrase where the dynamic level drops from *fortissimo* to *mezzo piano,* and finally *pianissimo.* During this phrase, the melodic line slightly descends down a fourth from D to A. Similarly, in the tenth component, each of the four 'Z's very gradually descends and becomes slightly smaller one after another, as if portraying these changes in the music, reflecting Stuart's constructions of corporeal, causal and extra-musical meanings by its depictions of higher pitches, a thinner musical texture, and a comfortable feeling.

Additionally, the melody returns back up to the same register as was heard in the beginning of the improvisation. Meanwhile, the previously rhythmic and chord-heavy accompaniment dissipates into a much thinner texture. The tempo has also stabilized back into its original tempo after the appearances of multiple *accelerando* in variations ten and eleven. To an extent, these changes in the coda have restored the music back to a tempo, musical texture, and dynamic level similar to variations one and two. The appearances of these familiar musical characteristics seem to underscore Stuart's feeling of comfort. Likewise, the tenth component reflects this sense of familiarity by decreasing back to a smaller size similar to the earlier components, and returning to a high location like the beginning of Stuart's drawing, evidencing Stuart's constructions of corporeal and intra-musical meanings.

Although the first phrase of the coda opens with a I chord (m. 79) to signify Stuart's acknowledgement of conquering a difficulty, it is not a definitive resolution. In fact, the harmony does not rest and moves immediately to a vi chord instead, seemingly relaying Stuart's lingering unease of "just trying to share that you do have feelings and sensitivity." The location of the tenth component also represents this sense of unrest. With two more components that are yet to follow, its location reflects Stuart's message that a full resolution has not arrived and that he has something more to say: "I've got the drive to carry on" (see Section 4.4.1).

The eleventh component in Stuart's drawing, then, is the flower, which represented how "you can actually continue to blossom again without being dragged down by this [*points to the black abstract shapes*]." Likewise, for the second phrase in the coda, Stuart held a similar association of how "it's the time to stop worrying about that", alluding to the earlier struggles depicted in variations five to eight. The second phrase, which is shown together with component eleven in the following table, comprises two measures where a delicately sparse melody and its gentle accompaniment both gradually expand into two octaves.

Table 4.16: Drawing of eleventh component, Stuart's comments, and coda (part 2)

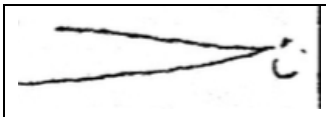
 **"You can actually continue to blossom again without being dragged down by this."** "And you want him to communicate that…"	 "It's the time to stop worrying about that."

Throughout measures 81 and 82, the use of *fermatas,* and several large intervallic leaps in both the melody and the accompaniment, create a sense of stillness and open space. These pauses and open textures especially highlight the swift two-octave expansions of both parts, which emulate Stuart's 'blossoming' metaphor. Just like how the chords in measure 82 expand in an ascending direction, the height of the flower rises significantly above the four 'Z's from the previous component, showing Stuart's constructions of extra-musical, corporeal

and causal meanings. Additionally, the four-octave span, which ascends from the low A to the high A in measure 82, seems to imitate the gradual rise from the lowest location of the dark abstract shapes to the high location of the flower, seemingly emphasizing on Stuart's assurances that he will 'not be dragged down.' Similar to the previous component, the flower's second-to-last location in the drawing reflects the unresolved ii – V7 chord progression, both of which allude to Stuart's wish of "[wanting] to communicate that [he has feelings and sensitivity]."

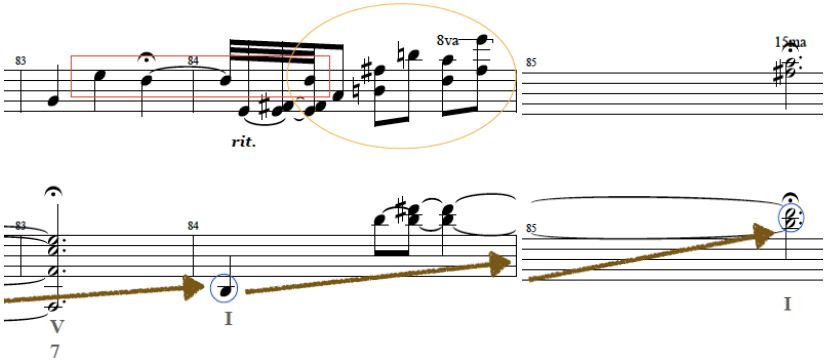
Finally, the twelfth component in Stuart's drawing consists of two objects: a *decrescendo* followed by an expression of happiness. For Stuart, this final component represented a "tailing off to a resolution that's a peaceful one; you've come through something." In the third and last phrase of the coda, Stuart provides a more pragmatic yet complementary explanation: "I would probably have subconsciously [thought]: story told, if you like." These two remarks, which both clearly refer to the end of Stuart's improvisation, strongly suggests that the twelfth component and the last phrase of the coda are related. The two are shown together in the table below.

Table 4.17: Drawing of twelfth component, Stuart's comments, and coda (part 3)



"And then just tailing off to a resolution that's a peaceful one; you've come through something."

"…that you're a person who has got some feelings."



"I would probably have subconsciously [thought]: story told, if you like."

In the twelfth component, the combination of a musical sign leading into an emotional expression suggests that the *decrescendo* represents more than just a decreasing dynamic level in the music. As the table above shows, the last phrase of the coda not only becomes softer in volume, but also conveys Stuart's description of 'tailing off to a resolution' through various musical factors. In particular, the last phrase can be interpreted as having three parts: a resolution in measure 83, followed by a musical after-thought in measure 84, and ending with

a final conclusion in measure 85. Continuing in *pianissimo*, the last phrase comprises a final three-note call in measure 83, followed by the melody rising gracefully to the highest octave on the piano through intervallic leaps of fourths and fifths. This rise in the melody is portrayed in the twelfth component by its high location in Stuart's drawing, showing evidence of corporeal and causal meanings.

As the phrase continues, the amount of notes becomes more sparse. Stuart's improvisation concludes with a distant and shimmering haze of sound lingering throughout the final two measures. The feeling of a peaceful resolution is depicted in measure 85, where the tempo gradually slows and comes to a rest on a gently ringing I chord in the highest register. The *decrescendo,* then, can be construed as a concise representation of several musical factors including: a decreasing dynamic level, a declining tempo, ascending from a lower to a higher register, and the decreasing number of notes used.

Stuart's description, "you've come through something", which refers to the expression of happiness in the twelfth component, suggests that it represents an emotional expression as well as an acknowledgement of a resolution, evidencing the construction of an extra-musical meaning. This description appears to resonate with a final reflection Stuart had provided for the coda. For Stuart, the very end of the coda also represented an acknowledgement of how "you're a person who has got some feelings."

Bringing this conceptual subsection and thus, the final part of the MSC analysis to a close, Stuart's drawing of his improvisation falls into Category A (association), Category F (formal response), and Category G (growth). In the case of Category A, the shapes, expressions, objects, and their repetitions, sizes and locations are visual representations of different musical expressions, dynamics, and idea pattern-matching, which evidence the presence of intra and extra-musical, and causal meanings. For Category F, the left to right directionality in the drawing indicates a sequence of chronological musical events, evidencing the construction of corporeal meanings. Lastly, Category G (growth), as well as representational meanings, is evidenced by the structural organisation of the whole drawing that feature groupings and common associations within and between individual components. In the following page, figure 4.19 shows a representation of the conceptual analysis of Stuart's drawing, in terms of the relationship between each drawn component and his improvisation.

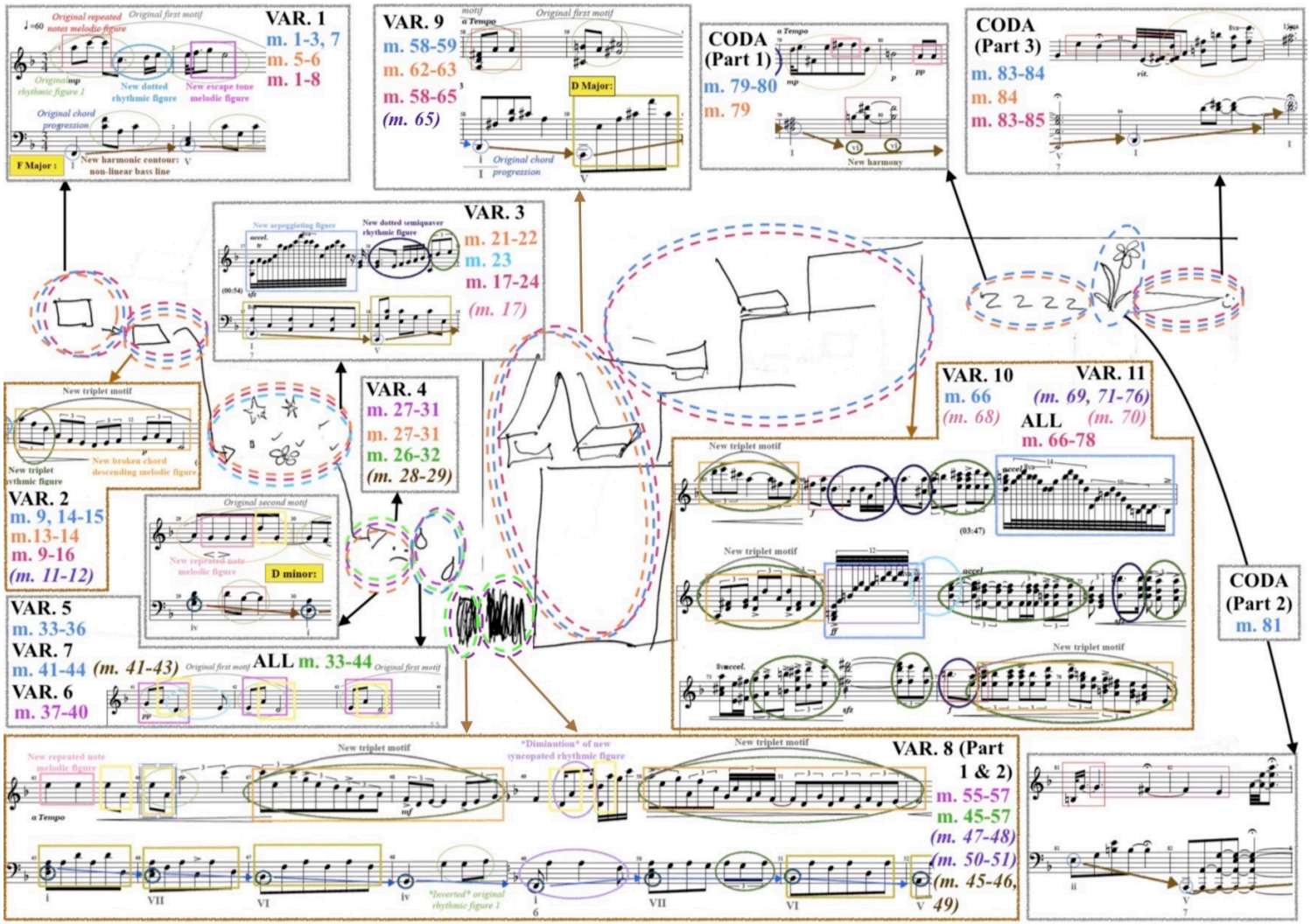


Figure 4.19: Summary of conceptual analysis (Stuart's improvisation drawing)

Figure 4.19 above shows an annotated version of Stuart's entire drawing together with the transcribed excerpts of his improvisation. In particular, it features the same colour coding system as figure 4.17, and shows precisely how Stuart's improvisation features particular elements from the musical stimulus. As figure 4.19 shows, the dotted circles surrounding each of the twelve components in the drawing is coded in six different colours. Each of the twelve components in the drawing also features an arrow that point to the corresponding excerpt from Stuart's improvisation, which were drawn from the analysis presented in tables 4.6 to 4.17. In addition, each component is shown with a list of colour-coded measure numbers indicating the corresponding parts from the musical stimulus (see figure 4.17) that appear in Stuart's improvisation. Furthermore, the large number of red, orange, and blue dotted circles also shows that the harmony and the first and third motives are featured more in Stuart's improvisation compared to other parts in the musical stimulus, thus triangulating the analysis in figure 4.17.

4.5.3 Summary

To summarise this subsection, during the reflection phase, Stuart's drawings showed evidence of his formations of a progressive reflection-based mental representation of the musical stimulus, and another progressive reflection-based mental representation of his improvisation. These are shown in the following two figures.

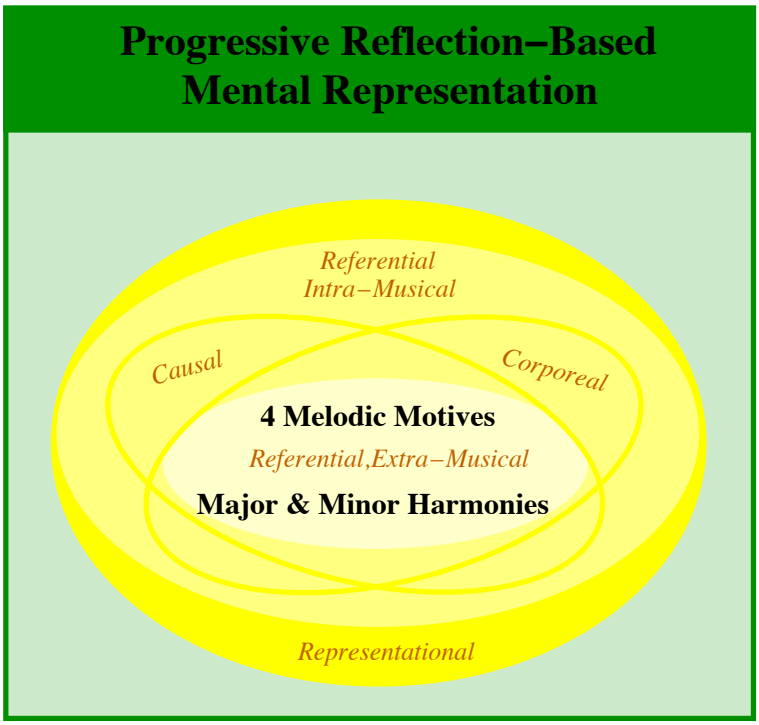


Figure 4.20: Stuart's progressive reflection-based representation of the musical stimulus

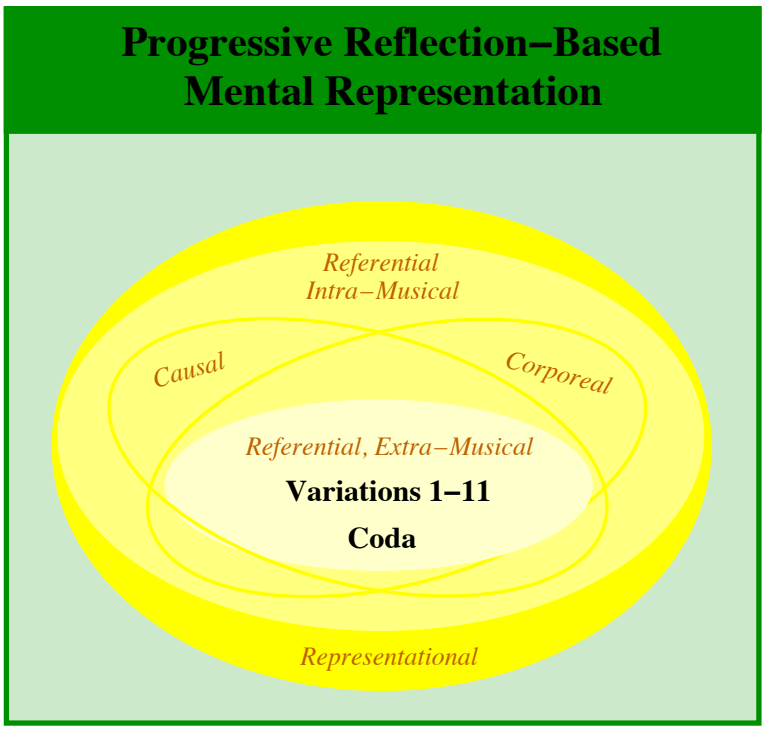


Figure 4.21: Stuart progressive reflection-based representation of his improvisation

As the two figures above show, both progressive reflection-based representations of the stimulus and the improvisation involved Stuart's constructions of representational, causal, corporeal, and referential (extra and intra-musical) meanings. These meanings are layered, illustrating the multiple dimension of Stuart's understandings of the musical stimulus and his improvisation.

4.6 Chapter summary

To summarise, this chapter has presented Stuart's mental representations across the four phases of learning, ideation, improvisation, and reflection. Within each phase, different types of mental representations were formed and used. Figure 4.22 below presents a diagram illustrating all the mental representations and their interactions across these four phases.

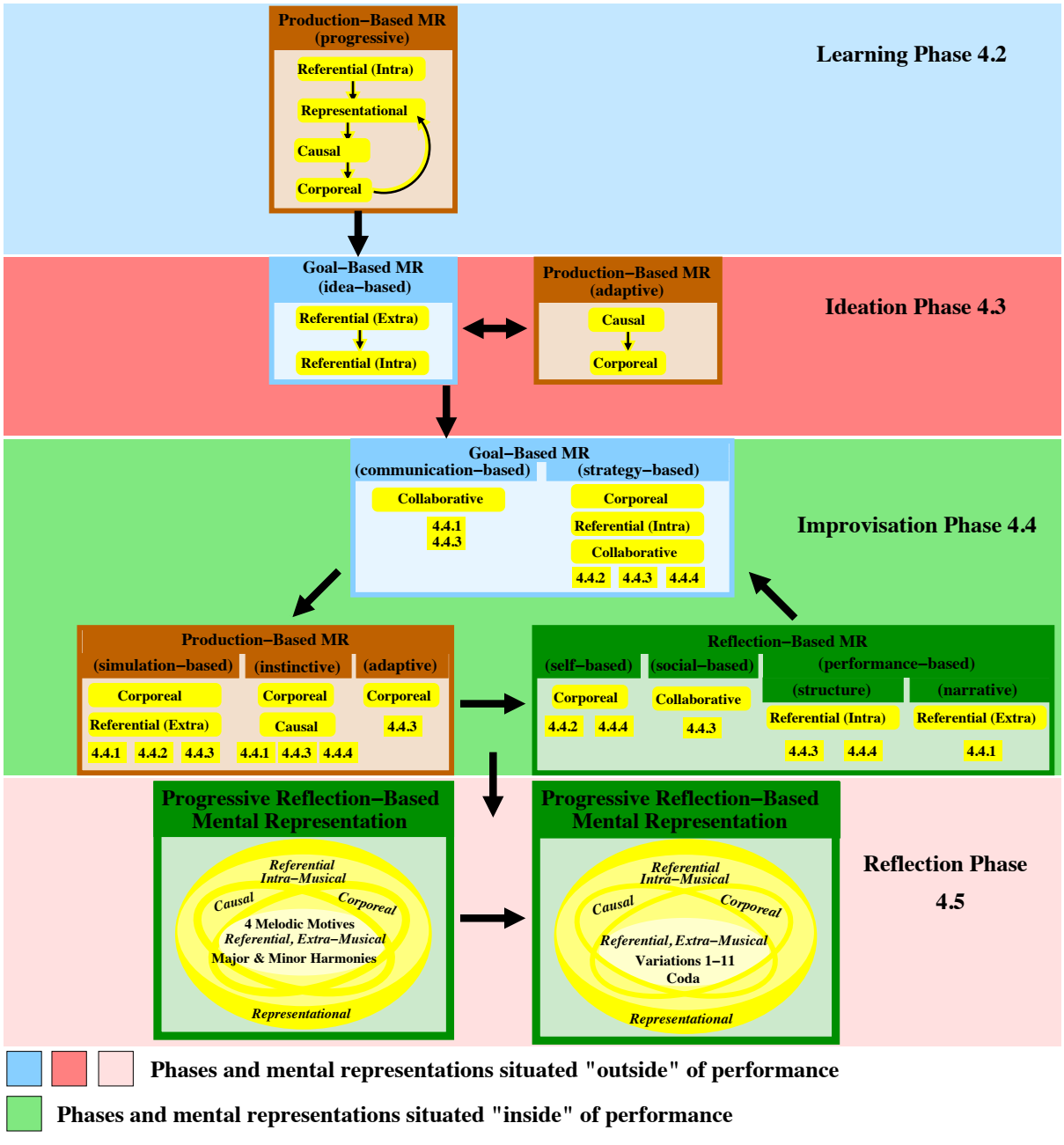


Figure 4.22: Stuart's mental representations and meanings across different phases

As figure 4.22 shows, the learning phase is characterised by the formation of a progressive production-based mental representation, where Stuart constructed multiple meanings to help him memorise the musical stimulus. During the ideation phase, Stuart formed two interconnected mental representations: an idea goal-based representation, and an adaptive production-based representation, where, his intra-musical meanings held a central role in the ideation process among other constructed meanings. Stuart's improvisation phase is characterised by a significant amount of activity in his simulation and instinctive production-based mental representations, and drawing from multiple types of feedback through his reflection-based mental representations. Finally, in the reflection, Stuart forms two progressive reflection-based mental representations that showed his multiple understandings of the musical stimulus and his own improvisation on it.

Chapter 5: Second Descriptive Case Study – Ron Drotos

This chapter presents findings of Ron's mental representations and meaning constructions as the second descriptive case study, drawing on the IPA, MSC, and musical analysis of multiple data sets comprising verbal, performance, observations, and drawings that were collected from Ron's Skype interview. This chapter is split into six subsections. It begins with an introduction to Ron and his interview setting. Sections 5.2, 5.3, 5.4, and 5.5 presents the different types of mental representations and meanings that were found during Ron's learning, ideation, improvisation, and reflection phases. The chapter concludes with a summary in Section 5.6.

5.1 Introducing Ron Drotos and the interview setting

This section presents the context of the setting for Ron Droto's[95] three-hour semi-structured interview, which took place on 9th July 2013. I had first contacted Ron through email on 29th June 2013 to introduce my research and myself after coming across his professional website where he offered piano improvisation lessons online. Ron had replied within a few days to express his interest in taking part in my study. I sent him a digital copy of the consent form that provided details of my study, the interview format, and assurances of ensuring his confidentiality and anonymity[96]. After Ron had emailed back to me a signed copy of the consent form, we scheduled a mutual time for the interview.

Ron Drotos, a middle-aged Caucasian male, is a professional pianist from the United States. Born in New York City, Ron has remained there, working as a professional performer, music teacher, and music arranger. As a teacher, Ron has taught improvisation of many musical styles for over twenty years. Over the last few years, he had built an online teaching platform, which includes teaching improvisation lessons through Skype. He has taught students from the Czech Republic, Ireland, South Africa, Greece, China, the Philippines, and the United States. As such, his teaching website has since gained a large following from international students (see https://keyboardimprov.com). As a performer, Ron has appeared internationally in music festivals, as well as in the Carnegie Music Hall in New York City. Ron is prolific in many musical styles, including classical music, jazz, pop, and Broadway, among others.

[96] Ron chose to use his real name in the present study.

Because Ron was located in New York City, our interview was conducted using Skype video. In order to transcribe the verbal data from the interview afterwards, free software called 'Call Note' was used to record both audio and video conversations on Skype. Before the interview I had also setup a shared platform on Google Docs for Ron to produce his drawings during the graphic elicitation task (see Section 3.3.3). In addition, I prepared the links for three musical stimuli that I had planned to use in an audio elicitation technique during our interview.

On the day of our interview on 9th July, it was 10 a.m. for Ron in New York, United States and 3 p.m. for myself in Cambridge, United Kingdom. When I met Ron through the Skype video, he was seated by his grand piano, even though many of his improvisation video tutorials featured him playing on an electric piano. Although I had a very limited view of Ron's home, the grand piano he was playing on appeared to be located in a separate room from his earlier video tutorials. The following figure shows a picture of Ron playing on his grand piano, as seen during the actual Skype interview.

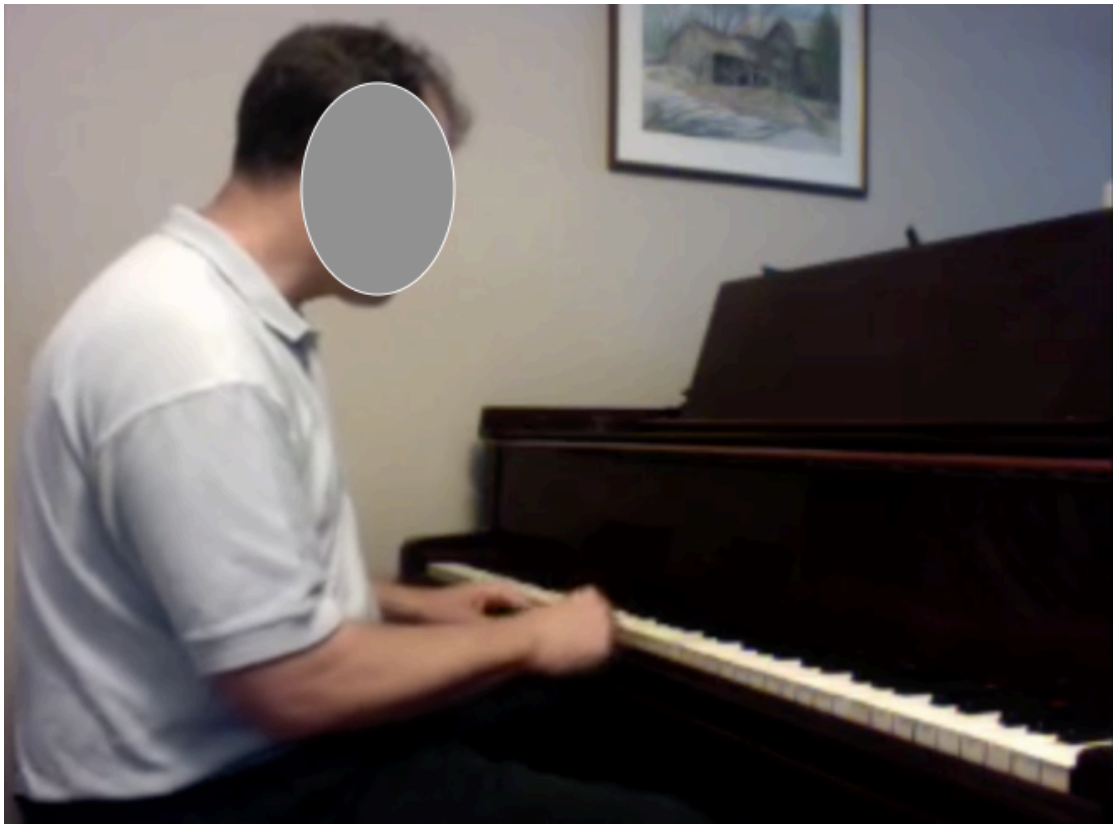


Figure 5.1: A partial view of Ron at his grand piano.

Immediately after connecting on Skype, I reminded Ron that the entire interview would be recorded and transcribed, to which he agreed. I also provided a brief overview of my study and the interview format, taking care to emphasise that I am interested in gaining a better understanding of his perceived experiences during improvising.

After introducing ourselves to each other virtually I began the semi-structured interview by asking Ron some questions about his musical background and experiences, and his thoughts on improvisation. This part of the interview lasted for 54 minutes. During this first interview session, I noticed that Ron did not appear to be nervous and was keen to share many of his thoughts and experiences. Ron also appreciated the format of the semi-structured interview where the structure is used "as a way to inspire rather than 'it has to be like this'". Like Stuart, Ron frequently used the piano to emphasise or illustrate his points during our interview. I also noticed that Ron strove to be very thorough whenever he explained a concept or an even an experience, taking care to provide the complete context of his story with as much relevant detail as possible.

At the end of the first hour, I suggested to Ron that we play one of the musical stimuli that I wanted him to improvise on. I began with an audio recording of "Answer Me", and after Ron had heard it once, I explained that he was welcome to listen to the recording as many times as he wished to. Remembering how much emphasis Ron placed on knowing the context fully, I told him that the late jazz pianist George Shearing had recorded the stimulus, although I did not disclose the name of the song. This information appeared to excite Ron, as he was an idol of Shearing and had once performed for him in Carnegie Hall. During this session, Ron listened to the stimulus seven times, asking me to pause at various points in the recording.

Using a retrospective graphic elicitation technique, I asked Ron to draw a visual representation immediately after he had learned the entire musical stimulus[97]. Using the shared platform on Google Docs, Ron used his mouse to produce a drawing. Although the mouse was sometimes unresponsive, Ron was still able to produce four relatively detailed drawings during the interview. This process took 10 minutes, which included Ron's verbal explanation of his drawing. Although a pen and a paper would have been easier for Ron to use, Google Docs enabled both Ron and I to immediately comment on the drawings. It also

[97] Which took approximately eight minutes, including both the melody and the harmony.

enabled me to closely observe how Ron drew all of the components in real-time, a valuable source of data that was much more difficult to observe in a face-to-face interview with Stuart[98]. Ron took to the drawing task well, explaining: "I'm good at geometry, and I think in shapes." However, this arrangement also presented some difficulties. For instance, the mouse that Ron was using to produce his virtual drawings was not very responsive. However, Ron was able to overcome the technical difficulties and produced several detailed drawings. Ron produced four drawings in total, two for each improvisation.

After finishing his drawing, Ron proceeded to perform an improvisation based on the musical stimulus, which lasted for two minutes and thirty-three seconds. After the performance of his improvisation, I followed up with another semi-structured interview, using a retrospective think-aloud protocol where I had asked Ron to listen to an audio-replay of his improvisation and to reflect on what he was experiencing or thinking about at key moments. I did not pause the music during the middle of the playback, as Ron seemed to prefer listening to the entire recording first. He then proceeded to comment and to reflect on his experiences, which lasted for 15 minutes.

After Ron had finished reflecting on his performance, I asked him to produce another drawing of his improvisation using Google docs, and to explain his drawing, a process that took another seven minutes.

The length of the entire process was forty-two minutes included Ron listening and learning the stimulus "Answer Me", improvising on it, reflecting on it through an audio-replay, and producing two drawings of the stimulus and the improvisation. After improvising on "Answer Me", Ron had asked if he can try improvising on a stimulus he had chosen himself, to which I agreed. As such, the same process was repeated for Ron's second improvisation based on the Bach Prelude in D minor, a stimulus that Ron had chosen for himself. In total our interview lasted three hours, during which Ron had recorded two improvisations as well as some shorter demonstrations.

[98] This kind of observation was more difficult to capture during Stuart's interview without risking the intrusion of physical space, due to the close proximity of a face-to-face interaction.

5.2 Learning: progressive production-based representation

This subsection explores Ron's 'brainstorming' phase moments before his improvisation. Drawing from Ron's comments and the observations I had made during our interview, the following focuses on how Ron had learned the given musical stimulus and then generated musical ideas from it. Ron listened to the same twenty-second audio clip featuring an instrumental version of the song "Answer Me" performed by pianist George Shearing. Like Stuart, Ron also listened to the recording, as many times as he wished until he felt familiar enough with the melody and the harmony to improvise on it. In total, Ron listened to the recording seven times over a span of six minutes. He spent four times listening to the entire clip and three times on particular Sections, asking me to pause the recording after each time so he could repeat what he had heard on the keyboard. During this process I encouraged Ron to share with me his thoughts while he was learning the stimulus, including any images, associations, ideas, and emotions that he was thinking about.

During the learning phase, Ron had formed a production-based mental representation of the musical stimulus by focusing on the means to physically reproduce it on the piano. During this process, he constructed four different types of meanings of the musical stimulus by forming connections between his own knowledge and the melodic and harmonic components from the musical stimulus. The four types of meanings are referential (intra-musical), representational, and causal meanings, which are presented over seven Sections to show how they were constructed and developed throughout Ron's learning phase.

5.2.1 Construction (referential, representational, causal)

Ron had immediately constructed a referential meaning after listening to the entire recording for the first time. In particular, the beginning of the musical stimulus led Ron to create an intra-musical association to the beginning of the second movement from Antonin Dvorak's ninth symphony, which featured the same melodic notes F-Ab-Ab in D-flat major. The former featured a triple meter, while the latter featured a quadruple meter, which suggests that Ron's intra-musical association was established based on a similar pattern of pitches rather than the rhythm.

Box 5.1: Observation of Ron's first hearing of the musical stimulus

> R: It sounded vaguely familiar. I don't think I've ever heard it exact. At first I thought it was Dvorak's New World Symphony…It's in D major? (R starts to play the beginning of the musical stimulus in D major with the melody in the same register as the recording, while an improvised accompaniment is played one octave lower. He pauses after playing the first three notes).
>
> (Source: Second hour, semi-structured interview, 9th July 2013)

Ron then categorized what he had heard into the key of D major, thus constructing his first representational meaning of the musical stimulus. A construction of his causal meaning then followed, shown by Ron's rapid ability in using the recording as an agent to locate the sound source (e.g. same register on the piano) and replicating the finger motion for playing the note pattern. At this point, Ron's improvised accompaniment suggests that he is focused more on learning the melody rather than the harmony of the musical stimulus.

5.2.2 Revision (representational), Development (causal)

Having listened to the entire recording a second time, Ron identified the key as D-flat major, thereby revising his earlier representational meaning of the musical stimulus. At this point, Ron was also able to replicate the entirety of the first and the fourth melodic phrases, suggesting that he had developed his causal meanings by adding these details.

Box 5.2: Observation of Ron's second hearing of the musical stimulus

> R: (R listens to the entire recording). Hold on, it sounds like D-flat major here. (R plays the first melodic phrase in D-flat major in the middle range on the piano). It's coming through as D-flat. (R replicates the last four notes from the musical stimulus). One more time.
>
> F: Of course, I'll play [the recording] as many times as you want.
>
> (Source: Second hour, semi-structured interview, 9th July 2013)

Ron's identification of these melodic phrases also show how he had started to construct another representational meaning, this time focused on the melodic structure of the stimulus. Additionally, Ron's ability to manipulate the first melodic phrase by playing it in the middle register, rather than in the higher register like the recording, suggests that he was already familiar with the notes and may have even memorised them. Moreover, although not explicitly noted by Ron, his relatively quick grasp of the fourth melodic phrase suggests that

he had also constructed another intra-musical association to "Shenandoah", a folk song that also featured the same descending four-note pattern. This important point will be discussed further in the ideation phase.

5.2.3 Development (causal, representational), Construction (corporeal)

Focusing on the melody, Ron continued to develop his causal meanings from the recording as he learned to reproduce the third melodic phrase. In doing so, Ron had also added more details into his representational meaning of the melodic structure, which now included information about the first phrase, the fourth phrase, and now the third phrase. The order in which Ron had learned the melody suggests that in addition to learning in chunks and recognizing familiar note patterns (e.g. phrases one and four), he also listened for patterns that featured a large pitch range with bold melodic contours (e.g. an ascending fifth and a descending sixth in phrase three).

Box 5.3: Observation of Ron's third hearing of the musical stimulus

R listens to the recording and plays along with it for the first three phrases. F then sees that R is trying to pick out several notes and pauses the recording to let him play without distractions.

R: Hold on…

R repeats a part of the second melodic phrase, and then moves on to replicate the entire the third melodic phrase.

R: Let me see…

R then goes back to play the first melodic phrase, accompanied by blocked chords that reflect the melodic rhythm in a I – IV – I 6/3 progression. He moves on to play the second phrase, which remains tentative and incomplete at this stage for both the melody and the harmony. During the third phrase, R replicates the melody over a ii chord. He then pauses before the fourth phrase.

R: One more time just to make sure I got it.

(Source: Second hour, semi-structured interview, 9th July 2013)

Additionally, Ron began to play a consistent pattern of harmonic progressions in his improvised accompaniment for the first and the third melodic phrases. Although these chord progressions were not in the recording, they seemed to be embedded in Ron's understanding

of the musical stimulus. Interestingly, Ron did not improvise a complete accompaniment for the second phrase, which he had not yet fully learned, suggesting that in Ron's case, the melodic material was a prerequisite for knowing the harmonic material. By this point, Ron had already constructed his causal and representational meanings together several times, which is a pattern that he would continue throughout the rest of the learning phase.

5.2.4 Development (causal)

Having learned three out of the four melodic phrases from the musical stimulus, Ron turned to focus on grasping the second melodic phrase, which remained the last component for Ron to learn in order to complete his representational meaning of the melodic structure. The difficulty of the second melodic phrase may be attributed to its less pronounced contour, which featured nine notes descending and ascending multiple times in stepwise intervals.

Box 5.4: Observation of Ron's fourth hearing of the musical stimulus

R listens to the recording and plays along with it until the end of the third phrase, fluently reproducing the first and the third melodic phrases over a I – IV – I 6/3 progression.

R: Ok, let me see.

R then returns back to work on the second melodic phrase, repeating several notes. F pauses the recording to let R work without distraction.

R: Ok, pretty close?

(Source: Second hour, semi-structured interview, 9th July 2013)

To grasp the second melodic phrase, Ron had reemployed the earlier approach of building on his causal meaning by listening to the recording and playing along with it. However, the complexity of the second phrase appeared to prevent Ron from listening and playing at the same time, suggesting that this multitasking approach could not support the learning of musical material featuring small intervallic changes. At the same time, Ron repeated the same improvised chord progression, indicating that he had begun to construct a representational meaning of the harmonic structure.

5.2.5 Development (causal, corporeal, representational)

This time, Ron adopted a targeted hearing approach. By focusing on listening to the recording without playing along, Ron was able to construct a causal meaning of the second melodic phrase that enabled him to replicate it on the piano. While doing so, Ron had continued into playing the third melodic phrase, which shared the same rhythmic pattern as the second melodic phrase, suggesting that he had formed an intra-musical link between the two parts.

Box 5.5: Observation of Ron's fifth hearing of the musical stimulus

R listens to the recording until the end of the second phrase.

R: Okay, turn it off there if you will. (R fluently reproduces the second and third melodic phrases, while tentatively playing I – IV – I 6/3 in the accompaniment)…Okay let me play that again so I don't forget. (R reproduces the first three phrases of the musical stimulus accompanied by a I – IV – I 6/3 chord progression).

(Source: Second hour, semi-structured interview, 9th July 2013)

Ron also accompanied the second melodic phrase with a few chords, indicating that he had started to build a harmonic progression after learning the melody. Ron then organised the different melodic phrases he had learned by playing them through in order, thereby completing his representational meaning of the melodic structure.

5.2.6 Development (causal, corporeal, representational), Expansion (causal)

Having learned the entire melody of the musical stimulus, Ron was thus able to build a more complete accompaniment underneath it. At the same time, Ron had actually reconstructed a representational meaning of a harmonic progression that was different to the one in the musical stimulus. In particular, the chord progression accompanying the first melodic phrase (I-IV) was similar to the harmony that was used to accompany the same melodic notes in Antonin Dvorak's ninth symphony. Additionally, the I 6/5 – IV chord progression Ron had used for the fourth melodic phrase could also be heard with the same four melodic notes in the folk song "Shenandoah".

Box 5.6: Observation of Ron's sixth hearing of the musical stimulus

R: (R listens to the third and fourth phrases from the recording). Oh, just like that?

R plays the fourth melodic phrase accompanied by a I 6/5 – IV chord progression. He then returns to the beginning and replicates the entire melody from the musical stimulus, while improvising the following chord progression: I – IV – V – I – ii – V – I – I 6/5 – IV.

R: Do I need to know the exact harmony? I was going to change the harmony. That's why I wanted to learn the melody so I can be more free with the harmony.

(Source: Second hour, semi-structured interview, 9th July 2013)

The appearances of these similar harmonic progressions suggest that Ron's intra-musical associations to the New World Symphony and Shenandoah were established based on the similarity of pitches for both the melodic and harmonic components. Interestingly, Ron's reconstructed harmony would later feature throughout his improvisation on the musical stimulus, showing a connection between the way he had learned the musical stimulus and its later impact on the improvised musical content. Ron's intention to focus on only the melody also explained why he was unable to construct a harmony earlier without knowing the melody.

5.2.7 Development (representational)

At this point, I clarified with Ron about learning the original harmony of the musical stimulus. I explained that while it was not a requirement to know the exact chord inversions, it would be better to know the general harmony to help minimize the variables between the participants. I also pointed out that knowing the original harmony might provide him with more musical material to improvise with. Having understood and agreed with my explanation, Ron proceeded to listen to the recording again. Upon listening to the first two phrases, he immediately identified the pattern as a 'descending thing', thereby constructing his representational meaning of the original harmonic component.

Box 5.7: Observation of Ron's seventh hearing of the musical stimulus

R: (R listens to the first two phrases of the recording). I see. He played…(F pauses the recording to let R speak without interruption)…he did that descending thing. (R immediately plays a I – I 6/3 – IV 6/3 – I 6/4 chord progression under the first and second melodic phrases).

(Source: Second hour, semi-structured interview, 9th July 2013)

Furthermore, Ron was also efficient in constructing a causal meaning, as was demonstrated by his quick ability to replicate most of the harmonic progression (excluding the minor iv chord) on the piano with the exact chord inversions. Ron's quick identification and execution suggests that he was familiar with this chord pattern, and had likely played it before in different contexts.

5.2.8 Summary

To summarise this subsection, during the learning phase, Ron constructed four different types of meanings while memorising the musical stimulus by ear. The following figure shows the progression of the mapping of Ron's meaning constructions across seven hearings over the course of the entire learning phase.

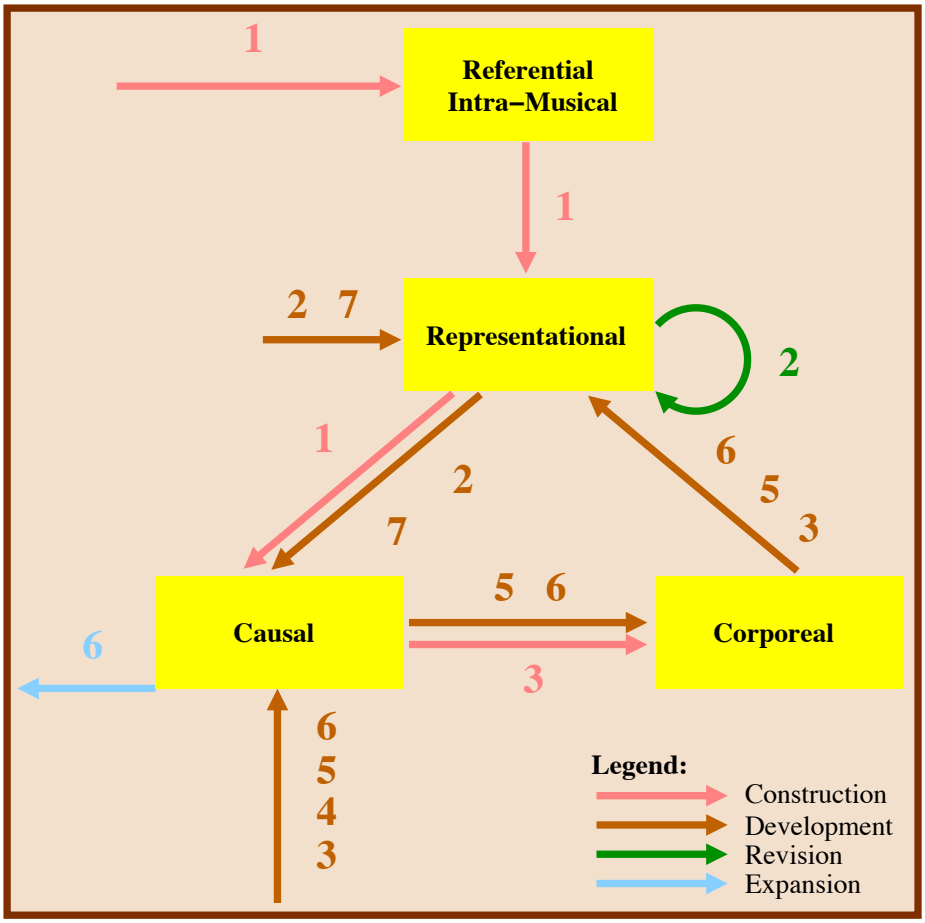


Figure 5.2: Mapping of Ron's meanings in his representation of the musical stimulus

The figure above shows the number of hearings (indicated by the numbers) that Ron took to memorise the musical stimulus, as well as which meanings were created during each hearing. (For a more detailed summary of the legend, see figure 4.2 in Section 4.2.7). As shown in the figure, the first hearing resulted in Ron's constructions (indicated by the pink arrow) of representational, causal, referential (intra-musiscal), and corporeal meanings. Following the first hearing, subsequent hearings of the musical stimulus resulted mostly in the further development of these meanings, as indicated by the many numbers listed beside the brown arrows. Like Stuart, Ron also revised his representational meaning of the key during the

second hearing, as indicated by the green arrow and the number two. Ron also expanded his causal meaning of the harmony by improvising new harmonies during the sixth hearing, as indicated by the blue arrow and the number six.

5.3 Ideation: idea and strategic goal-based representations

This section presents the ideation phase, which discusses how Ron had generated ideas from the musical stimulus. During Ron's ideation phase, two goal-based mental representations were formed. From these mental representations, five meanings were constructed: referential intra-musical, referential extra-musical, corporeal, referential intra-musical, and collaborative meanings. These two mental representations are presented over two stages in Ron's ideation phase.

5.3.1 Idea-based goal: referential intra and extra-musical

Ron first formed an idea-driven goal-based mental representation from his intention of generating ideas. From this goal, he created his intra-musical and extra-musical meanings with his associations to the song 'Shenandoah' and Dvorak's ninth symphony, and a visual imagery of "a little field with white flowers". In particular, Ron's extra-musical meaning was likely influenced from the programmatic depictions of nature in both 'Shenandoah' and Dvorak's ninth symphony. Interestingly, Ron's earlier intra-musical association to Antonin Dvorak's 'New World Symphony' was historically well known for its musical portrayal of the wide, open spaces in America. Dvorak himself had written his symphony inspired by what he had seen during his visit to Iowa in 1893. It can be argued, then, that Ron's extra-musical association was influenced by his earlier intra-musical association to Dvorak's symphony.

> R: Actually, you know what, I already had one. I didn't even realise it. I was thinking of it – believe it or not, I was thinking of a little field with wild flowers.
>
> (Source: Second hour, semi-structured interview, 9th July 2013)

At the same time, Ron's intra-musical association between the fourth melodic phrase and the American folk song, "Shenandoah", may have also contributed to the above imagery. The lyrics to the folk song, which Ron was familiar with, also makes references to scenes of nature, including phrases with the words "rolling river" and "across the wide Missouri". Moreover, Ron's performance of "Shenandoah" described below also showed the same I 6/5

– IV harmonic progression that he had played earlier to accompany the fourth melodic phrase during the learning phase.

Box 5.8: Observation of Ron's ideation phase

> R: It sounds like it started with the New World Symphony. I think this thing…(R plays the second melodic phrase: Ab-Gb-Gb-F-Gb-Ab-Gb-F-F)…comes from somewhere else too, I'm not sure. And then the end, he does 'Shenandoah', the folk song…(R plays the fourth melodic phrase: Db-C-Bb-Ab, and then sings the part of the 'Shenandoah' folk song that featured these notes)…"Oh Shenandoah, I long to hear you, far away you rolling river"…(Ron accompanies himself on the piano with a I – iii – I 6/5 – IV – I 6/5 harmonic progression).
>
> (Source: Second hour, semi-structured interview, 9th July 2013)

Unlike Stuart, Ron did not identify the musical stimulus as the song "Answer me" during his interview, suggesting that he may not have been familiar with the song. As a way to make meaningful sense of the music, he used his musical knowledge to construct intra-musical and extra-musical associations to various melodic and harmonic components in the musical stimulus.

5.3.2 Strategic goal: corporeal, referential, collaborative

Following the formation of his first goal-based mental representation, Ron formed a second strategic goal-based mental representation from his intention of deciding how to start his improvisation. From this second goal, Ron constructed three meanings: corporeal, referential intra-musical, and collaborative meanings, as evidenced by his references to an experienced challenge, to other songs, and to the performance context.

> R: So when you say to improvise it's kind of funny, because I have to make a decision whether to go with a certain style that might be the same to what George Shearing did, which is kind of like some light semi-classical piece, like a humouresque. He had a little bit of a pop feel but [it's] semi-classical. I'm thinking popular from 1910, those pieces written like that. Or do I want to just *really* say, "Okay, I can go anywhere I want with it." And then I have to decide. Well, I don't know what that is! It involves a different type of listening to yourself, I think. I have to make that decision…If I'm playing a piece on a programme and I can do whatever I want, that's very different than when I'm working with a group…You have to see what's appropriate in that context…you have to decide what's appropriate and how far internally you want to go at any moment…I'll tell you specifically that one of my challenges I'm facing is to how to get away from what George Shearing did.
>
> (Source: Second hour, semi-structured interview, 9th July 2013)

In particular, Ron constructed a corporeal meaning by organising his associations into a set of constraints in order "to be different" and "to get away from what [the recording] did". These constraints were further informed by two more meanings that Ron had created. The first was another intra-musical meaning with Ron's associations to the genre of "semi-classical music" (including "a bit of pop" and "humoresque"), "from the 1910's". Next, Ron constructed a collaborative meaning by reorganising his "group" and "solo" experiences to decide on the "what's appropriate in this context".

5.3.3 Summary

To summarise this subsection, during the ideation phase, Ron formed two types of goal-based mental representations. Figure 5.3 below shows a representation of the entire ideation process.

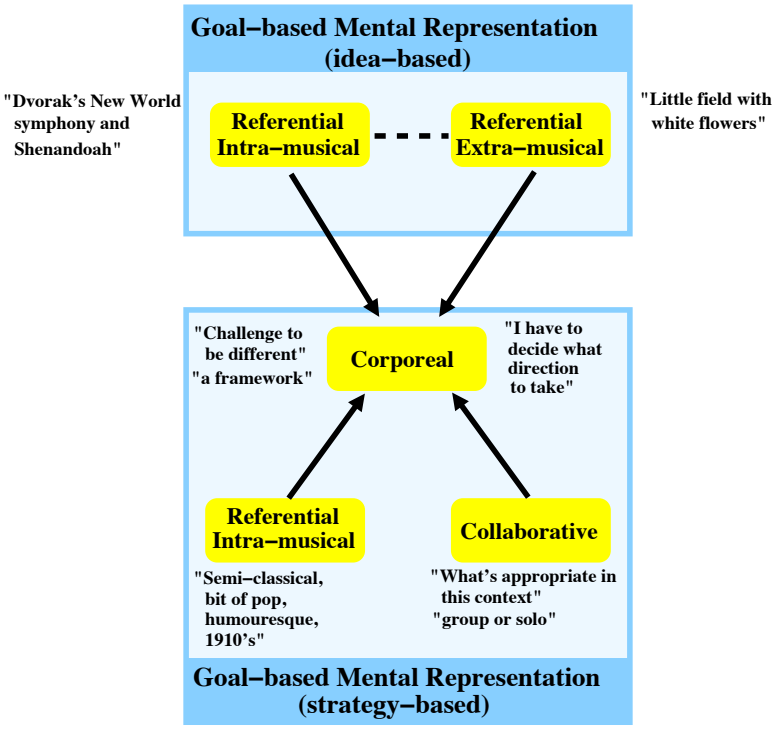


Figure 5.3: Ron's mental representations of his initial musical ideas

As the figure above shows, the first type is an idea goal-based representation, where Ron formed both intra and extra-musical meanings. The second type is a strategic goal-based representation, where Ron formed three meanings: corporeal, referential (intra-musical), and collaborative. These two mental representations are connected through Ron's construction of corporeal meanings in the strategic goal-based representation, which indicate Ron's corporeal meaning as the central part of his ideation phase.

5.4 Improvisation: goal, production, reflection based representations

This section examines Ron's perceived experiences of improvising on the given musical stimulus, drawing from his verbal reflections during a retrospective think-aloud protocol (see Sections 3.3.3, 4.1, 4.6) that took place after his improvisation. Like Stuart, Ron was asked to listen to an audio-replay of his improvisation and to reflect on what he was thinking about during particular moments in his performance. The playback of the recording was paused at various points where necessary in order to allow for Ron to expand on his reflections.

During his improvisation, Ron employed three types of mental representations that were goal-based, production-based, and reflection-based. These mental representations were formed during four kinds of activities that Ron was continuously engaged in throughout his performance: (1) constraint-based scaffolding, (2) establishing flow, and (3) monitoring the performance. Within these mental representations, Ron constructed five types of meanings: (1) referential (intra-musical), (2) referential (extra-musical), (3) corporeal, (4) collaborative, and (5) causal. In the following, these various mental representations and meanings are presented over four subsections. Although many meanings were present throughout Ron's improvisation, the following subsections focus on the meanings that featured most prominently from the analysis of the verbal and observation data.

5.4.1 Constraint-based scaffolding: referential, corporeal, causal, collaborative

This section presents Ron's mental representations and his meaning constructions during moments where he was focused on establishing boundaries for his improvisation through his selections of musical styles and ideas. At the start of his improvisation (see Appendix A.2.1), Ron had an intention to "start differently" from the musical stimulus. This strategic goal-based mental representation was formed earlier during the ideation phase, during which he constructed three meanings that are corporeal, referential (intra-musical), and collaborative (see Section 5.3.2). From this strategic goal, Ron made another decision to play a type of sound, indicating that he had formed another idea goal-based mental representation. From this idea-based goal, Ron constructed a referential intra-musical meaning with his association to Beethoven.

R: It was interesting because I forgot about the daisies already, a little intentionally, because that was what I got from [George Shearing]. I mean, when I started, I'm not going to decide in advance where I'm going with this…but I'm going to start a little differently, in terms of texture and mood. And I kind of went back a little bit to this…(*R plays three D-flat major chords, or a I – I 6/3 – I 6/3 harmonic progression, slowly in the slow register, sustained with the damper pedal*)…like I would play it before. I started with a little more of a 'Beethoven' type, as opposed to [George Shearing's]…(*R plays the original musical stimulus in a high register*)…the 'Dvorak' or humoresque, light semi-classical style.

(Source: Second hour, semi-structured interview, 9th July 2013)

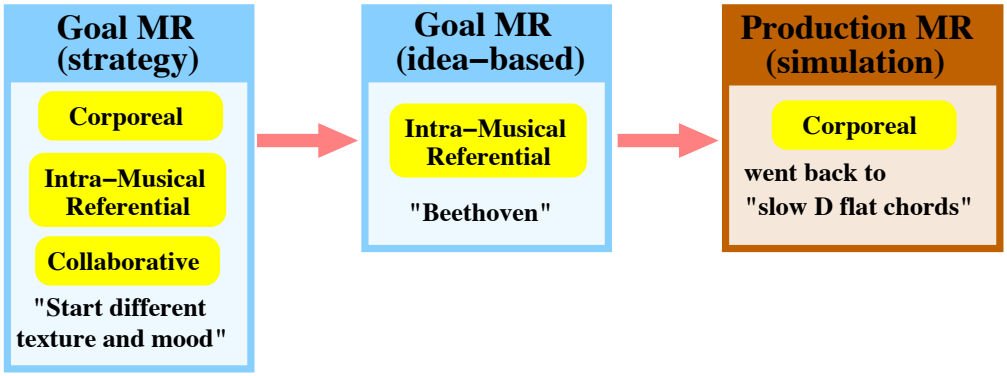


Figure 5.4: Ron's mental representations during the introductory recitative

Figure 5.4 above shows a diagram of these three mental representations at the start of Ron's improvisation. To implement his idea-based goal, Ron intentionally returned back to playing a set of low and ringing D flat major chords, thus forming a simulative production-based mental representation. In particular, Ron's simulation production approach is based on an imitation of a similar set of chords he had once performed to surprise a noisy audience into silence Ron had also provided a demonstration of these chords earlier in the interview. In his improvisation, however, Ron had reorganised his movements to play a softer version of the chords, which resulted in the construction of a corporeal meaning. Furthermore, In order to form his current idea goal-based mental representation, Ron first needed to eliminate competing associations to "daisies" and "Dvorak" from the ideation phase (see Section 5.2.2). This suggests that Ron can only create one goal and meaning at a time when he is improvising.

Ron's desire to be different from the musical stimulus, which indicated the formation of strategic goal-based mental representations, continued to inform his decisions throughout the rest of his improvisation. In particular, it manifested at two points in his improvisation in the

form of a minor iv chord during the beginning of the introductory recitative, and the end of the coda (see mm. 5 and 33 to 34 in Appendix A.2.1 and A.2.5). As Ron notes:

> R: A couple times I played the minor iv chord that [George Shearing] didn't play. And I kind of heard it a little vaguely in my head the first time before I played it. I wasn't sure whether to go there or not. And then I said, "Ok" – I remember thinking – "This I'll make it a little more different than George Shearing too." I didn't do it just to be different, but since I heard it in my head I went with it, partly to be a little different.
>
> (Source: Second hour, semi-structured interview, 9th July 2013)

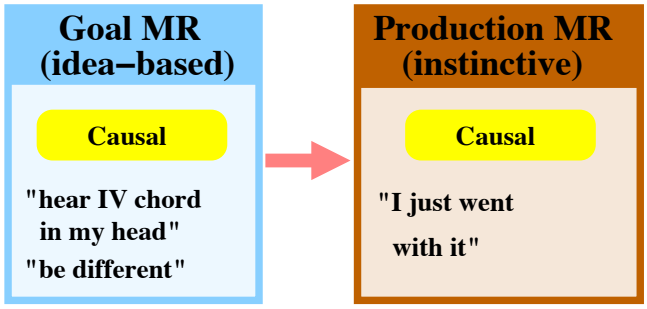


Figure 5.5: Ron's mental representations during measures 5 and 34

In both of the above cases, Ron's strategy-based goal had led to an instinctive execution of his musical ideas at the piano, indicating that his goal-based mental representation had informed his production-based mental representation. In addition, both kinds of mental representations involved Ron's constructions of causal meanings, where he heard or imagined the sound in his head before playing it. However, Ron's reference to the minor iv chord was in fact featured in the second phrase of the given musical stimulus. Ron claimed that he did not hear the iv chord from the recording, which is supported by the fact that he did not physically play the chord on his piano during the learning phase. At the same time, Ron had strong audiation skills and had heard the iv chord before he improvised, which suggests that he had likely heard the chord and memorised it without realizing.

To summarise, Ron established constraints for his improvisation through the use of strategic goal-based mental representations, which appeared to have a long-term effect throughout his improvisation. These strategic goals were implemented through both instinctive as well as simulative production-based mental representations, the effects of which can be seen in the introductory recitative and the coda.

5.4.2 Establishing flow: corporeal, referential, collaborative

This section presents the mental representations that Ron had formed during moments where he was establishing flow in his performance. In particular, Ron was engaged in flow establishment at the beginning and end of the introductory recitative. The experience of flow appeared to be involuntary, as Ron recalled feeling certain emotional reactions from his music.

> R: So when I was improvising on George Shearing's piece here for you, I remember thinking – I wasn't nervous when I started, but, you don't really know where it's going to go, and I wanted to be pretty good. But at a certain point when that emotion kicked in…
>
> F: Emotion?
>
> R: Um, it happened pretty quickly, but I really started feeling something from the music. That was a fun spot for me, because I knew that I could make it my own.
>
> F: Can you tell me where it happened?
>
> R: It probably happened a little bit right at the beginning, because I played those chords in a certain way. (R plays a D-flat major chord with both hands in the lower register). It happened a little later, but it's particularly when we went to that: (R plays Db-C-Bb-Ab). I started rolling with it a little bit…
>
> (Source: Second hour, semi-structured interview, 9th July 2013)

In particular, Ron reported experiencing emotional reactions to specific chords and motives, and more importantly, the *way* in which he was playing them. Only then, did Ron start to genuinely enjoy his improvising experience. In addition, Ron elaborated on the kinds of emotions he felt at that moment.

> F: What emotions did you experience there?
>
> R: (R takes a long pause to think) Um…that's hard to put into words, and I know you know that, but…not really defining it at the moment, but you're feeling something. (R takes another pause to think). I think there was a combination of…Like a more deep feeling, like maybe love for something, but tenderness at the same time.
>
> (Source: Second hour, semi-structured interview, 9th July 2013)

From the way he played the chords in measures 1 and 2, and the four-note motive in measures 7 and 8 (see Appendix A.2.1), Ron's reports of emotional reactions and feelings of enjoyment evidences the formation of two self-directed reflection-based mental representations during

those two moments. It also indicates that these reflection-based representations had formed as a result of an instinctive production-based mental representation, where Ron had first played the music instinctively and then reacted from it afterwards, as evidenced by his corporeal-based awareness of "a certain way" in which he was playing. In addition, the mixture of emotional feelings experienced by Ron led him to temporarily abandon his earlier strategy of consciously striving to be different.

> F: So you mean the part when it went: (F sings the four note motif: Db-C-Bb-Ab)?
>
> R: Yeah, at that point I just said: I'm not just sort of copying [the musical stimulus] and I'm not doing something just to play differently from [it], and I'm not doing anything because I think Frances wants me to do this so it's good for her project or something. At that point I just forgot everything. I could do whatever I wanted.
>
> (Source: Second hour, semi-structured interview, 9th July 2013)

Ron describes a sense of freedom from the previous inhibitions he had earlier in the performance. The confidence of feeling that he could "do whatever he wanted", and his intention of "mak[ing] it my own", suggests the formation of a type of inspirational goal-based mental representation, where this sense of confidence evidences his construction of corporeal meanings. Furthermore, Ron later pointed out his intention of conveying "a feeling, going with the feeling, and the journey through the different feelings" throughout his improvisation, which evidences the formation of another communicative goal-based mental representation and the construction of collaborative meanings. In the following figure, then, a diagram illustrates these several representations that Ron had created at particular measures in the introductory recitative.

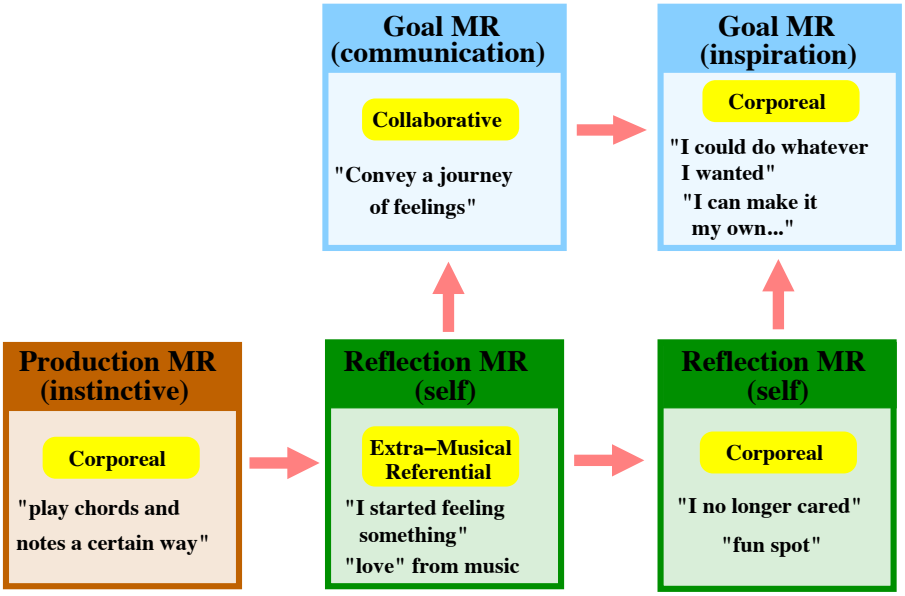


Figure 5.6: Ron's mental representations during measures 1, 2, 7, 8

To summarise this section, Ron's activities of establishing flow during his performance resulted in the formations of two self-directed reflection-based mental representations, which led to the formation of two types of goal-based mental representations. These four representations were formed as a result of the way Ron had played certain chords and motives through his instinctive production-based mental representation, which took place in the opening and end of the introductory recitative.

5.4.3 Monitoring the performance: referential, corporeal, collaborative, causal

Like Stuart, Ron was also occupied with monitoring different aspects of his improvisation throughout his performance. Some of Ron's monitoring activities were focused on more general aspects of the improvisation in terms of finding various ways to control the direction of the music. Ron explains:

> R: This kind of improvising...even though that wasn't necessarily a playful version of the piece, there's a playfulness about it in that you're playing with the energies. Like, when's the momentum building, let it go, and then ok, do I want to come to this big thunderous peak or is it going to go back down. Sort of like these waves…There's that playfulness.
>
> (Source: Second hour, semi-structured interview, 9th July 2013)

Ron's metaphorical description of his improvisation evidences the formation of a type of reflection-based mental representation, where he is monitoring the improvisation for musical possibilities that might arise from this "playfulness", and the opportunity of "playing with the

energies" in the music. Furthermore, Ron expands on this metaphor of playfulness in the form of a visual imagery:

> R: So it's kind of making some of those decisions, but I wasn't totally controlling. It's almost like the water's going to go downhill – there's a little stream of water going downhill, but you direct it a little bit. You can put your foot in the way to change the direction, or dig a little trench, or put a stick there, or something, but the water is still going to go down. You can't control every aspect of the water going downhill. See the analogy? You got a little hill, and you dump a bucket of water, it's got a force of its own. But if you want you can direct it a little bit.
>
> (Source: Second hour, semi-structured interview, 9th July 2013)

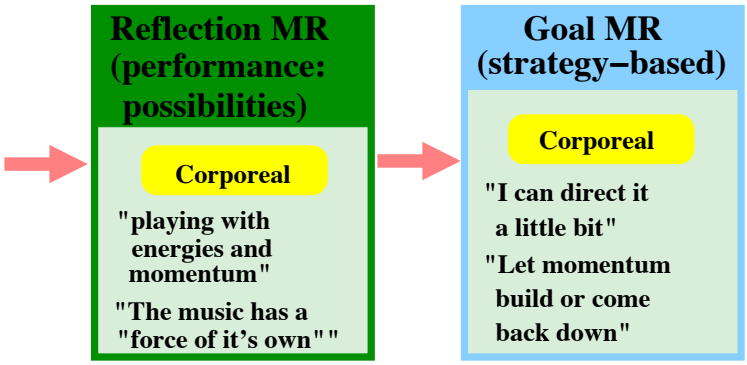


Figure 5.7: Ron's mental representations during both arias and the reprisal

As figure 5.7 shows, Ron's descriptions of his improvisation as having a force of its own, which evidences the construction of a corporeal meaning, leads him to form a type of strategic goal-based mental representation that responds and capitalises on these potential moments of musical opportunities. These goal-driven strategies, which involve Ron's construction of corporeal meanings, include opportunities to direct or influence the improvisation in small ways and to shape the momentum of the music. The long-term musical influences of such strategies can be seen throughout both arias and the reprisal, where waves of crescendos and tempo fluctuations are featured.

In addition, Ron monitored and found musical possibilities by recognising particular motives in his improvisation. One such example took place at the end of the introductory recitative leading into the beginning of aria A, where the fourth motive first appears (see mm. 7 to 9 in Appendix A.2.1, A.2.2). At this point in his improvisation, Ron had just experienced an emotional reaction and enjoyment (see Section 5.4.1) from playing the four-note motive in a

certain way through his instinctive production-based representation.

> R: When I got to that point, when I got to the end (R plays the notes Db-C-Bb-Ab), I said 'Ok, that's Shenandoah'. So what I did was instead of treating his melody as a tune that I would cycle through…I did more of a free association kind of thing. I got to the end [of the introduction], and I decided to just improvise over that (R plays the notes Db-C-Bb-Ab again), rift on that. And then I came back to other melodies at different times. And one point I played this (R plays the second melodic phrase: Ab-Gb-Gb-F-Gb-Ab-Gb-F-F) and I decided to echo it in the left-hand (R plays a variant with his left-hand: Gb-F-F-Eb-Eb-Eb-F-Gb-Ab).
>
> (Source: Second hour, semi-structured interview, 9th July 2013)

In addition to these emotional reactions, Ron had formed another reaction of recognising the four-note motive from another song, which indicates the construction of a referential (intra-musical) meaning. In particular, Ron's recognition of this motive evidences the formation of a reflection-based mental representation, where he focuses on the familiarity and the musical possibilities from this motive. This recognition leads Ron to form a strategic goal-based mental representation through his intentions of improvising over this motive. In addition, Ron's awareness of his own motivation at this moment indicates the construction of a corporeal meaning. Furthermore, Ron shares a personal connection he has to this four-note motive.

> F: So you decided to focus on that motif…(F sings Db-C-Bb-Ab, the last four notes from the fourth melodic phrase in the musical stimulus)…and then you kind of developed it. What made you focus on that?
>
> R: Well, I had played the song "Shenandoah" before. I did an arrangement and conducted a high school group with that one too. And that little motif reminds me know of it… I didn't really go to the song but I maybe played that part a little bit like I was playing "Shenandoah".
>
> F: So you had linked back to a particular song, and even a particular performance of the song?
>
> R: Yeah! I didn't stay there that long; I didn't want it to be a copy of something that I've done before, because of the purposes of this.
>
> (Source: Second hour, semi-structured interview, 9th July 2013)

In particular, Ron describes how his playing had imitated a previous performance, which evidences the formation of a simulation production-based mental representation. The

following figure, then, shows a diagram of the mental representations that occurred at measures seven to nine.

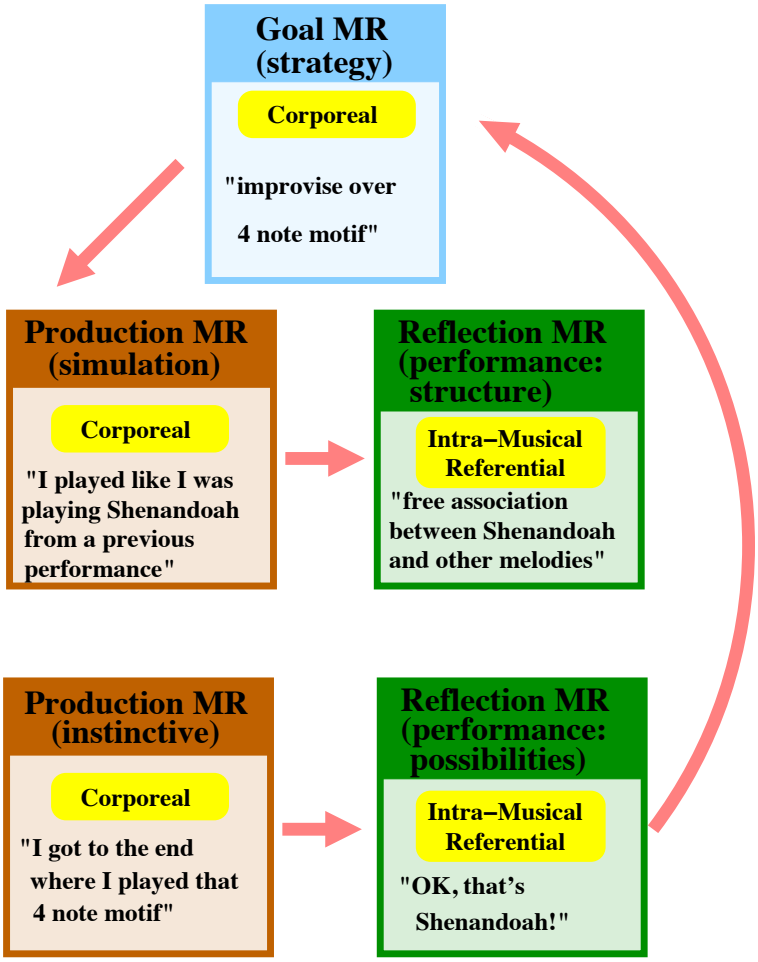


Figure 5.8: Ron's mental representations during measure 7 and Aria (A)

Figure 5.8 shows the progression of how a musical idea undergoes the micro stages of conception, development, and execution. In Ron's case, the conception of the idea came first from its instinctive production and recognising its musical potential. Ron forms a development of this idea through a strategic goal, which is then executed at the piano through imitation. Lastly, the diagram also shows Ron's formation of another reflection-based representation and the construction of referential (intra-musical) meanings, as evidenced from an analytical description of his improvisation in terms of a "free association" between "rifting" on the "four-note motif" and "[coming] back to other melodies at different times.

In addition to monitoring for musical possibilities, Ron also spoke about a general awareness of the audience. In particular, he describes this kind of monitoring as an activity as "this

balance between the witness and creator", indicating the presence of a type of socially-directed reflection-based mental representation.

> R: And it's sort of like…this balance between the witness and creator at the same time. Yeah, there is that balance. And I think it goes back to what I was saying before: about speaking. If you have a certain speech about something, you have to find a balance there. You might ad lib a little bit, or use the energy of the crowd. You're not going to totally go off in an inappropriate direction. (Source: Second hour, semi-structured interview, 9th July 2013)

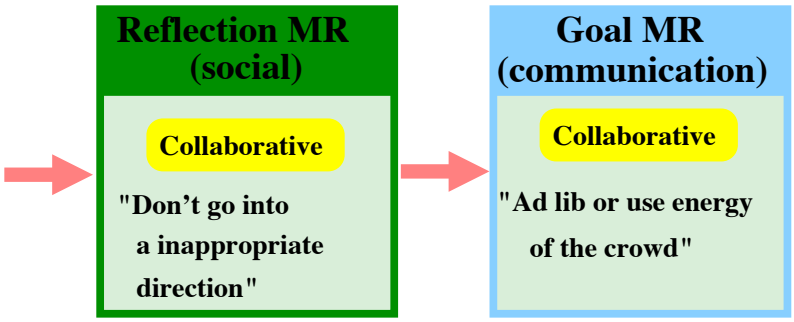


Figure 5.9: Ron's mental representations for audience communication

As figure 5.9 shows, this type of a social-oriented reflection involves Ron's construction of a collaborative meaning where he is mindful of what is appropriate for the audience. In addition, this reflection leads to a formation of a communicative goal-based mental representation, where Ron constructs collaborative meanings from interacting with the energy from the audience.

To summarise this section, Ron's activity of monitoring his performance resulted in the formations of reflection-based mental representations that focused on finding musical possibilities from the improvisation. This can lead to strategic goal-based representations that provided an overall plan for guiding the general direction of the improvisation, or more specific plans such as implementing a motive in a particular way through imitation of a previous performance. An example of the latter can be seen in measures 7 to 9 towards the beginning of the first aria.

5.4.4 Summary

To summarise, this section has presented Ron's goal, production, and reflection-based mental representations that were formed during the activities of constraint-based scaffolding, establishing flow, and monitoring the performance. The formations of these mental representations involved the constructions of referential (intra and extra-musical), collaborative, causal, and corporeal meanings throughout Ron's improvisation. In the following page, figure 5.10 presents a summary of these mental representations and their interactions during Ron's performance.

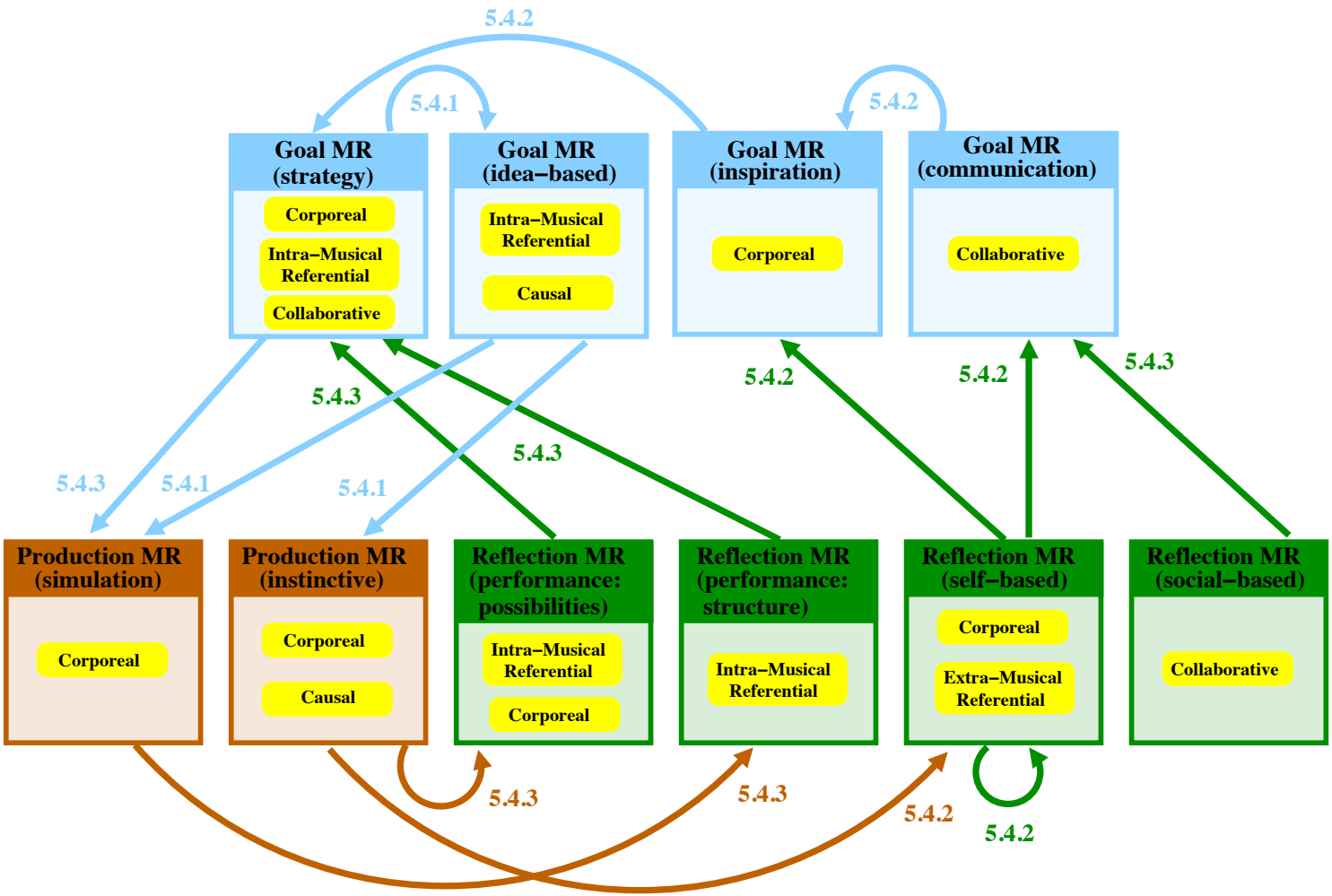


Figure 5.10: Summary of Ron's mental representations during the improvisation phase

As figure 5.10 shows, Ron's goal, production, and reflection-based mental representations have been arranged into a format that is adapted from Lehmann's (1997) model. The interactions between these mental representations are supported by references to the Sections in which they were presented. From this diagram, Ron's mental representations during his improvisation is characterised by a significant amount of activity from his idea and strategic goal-based mental representations, as shown by the large number of inputs and outputs in the blue coloured boxes. The higher number of green-coloured boxes, representing the different types of reflection-based mental representations that were present, also shows Ron's use of feedback from a variety of sources. Lastly, Ron's production-based representations are shared between two types of simulation and instinctive implementation approaches.

5.5 Reflection: progressive reflection-based representations

Section 5.5 draws on two illustrations produced by Ron to report on his progressive reflection-based mental representations of the given musical stimulus, and of his own improvisation. Like Stuart, the data that was used to analyse Ron's drawings came from a semi-structured interview that was conducted after the performance of his improvisation. These drawings were analysed using Elkoshi's (2002, 2004) MSC Method of analysis (see Sections 3.4.2 and 3.5.4).

5.5.1 Drawing of musical stimulus

This subsection presents the morphological, structural, and the conceptual analysis of Ron's drawing of the musical stimulus in three parts. In the first part, the morphological analysis reveals two main components in the drawing. In the second part, the structural analysis shows how the drawing corresponds to the musical stimulus from a right-to-left direction. Lastly, in the third part, the conceptual analysis presents the individual components of the drawing with the relevant parts of the musical stimulus. In the following figure, Ron's drawing of the musical stimulus is presented.

Figure 5.11: Ron's drawing of the musical stimulus

Morphological analysis: referential

From a morphological viewpoint, Ron's drawing of the musical stimulus shows constructions of referential intra-musical meanings, as evidenced by the repetition of similar shapes and lines. In particular, it features two main components. The first component is a sequence of fifteen short thin marks that project diagonally across the page. Each mark has a different length and shape. When viewed altogether, the markings appear to form two separate contours. The two contours are separated by a distinct air gap. One contour, located at the top right corner, comprises six markings that are arranged into a relatively straight line. The other contour, which is twice the length of the first contour, spans diagonally from the left corner to the middle of the page and comprises eight markings that are arranged into a rough wavy line.

The second component comprises another sequence of four closed abstract shapes. These shapes, which resemble small-distorted horizontal rectangles, are also positioned in a straight diagonal line across the page and run parallel in the same direction beneath the thin markings. Like the markings, each abstract shape is different. When viewed in a left-to-right linear direction, the abstract shapes appear to increase very gradually in size. Additionally, the two shapes in the middle are slightly more distorted than the two shapes located towards the top-right and bottom-left corners. Overall, the drawing shows evidence of intra-musical meanings in terms of the similarities between components.

Structural analysis: referential, corporeal

From a structural viewpoint, the drawing shows Ron's constructions of referential as well as corporeal meanings. This is evidenced by the groupings of several components and the direction of the drawing. In particular, a referential intra-musical meaning can be identified by the repetition of two larger groupings when the lines and shapes are viewed in parallel. The shorter contour lines and the abstract shape at the top-right corner appear as one unit, while the longer contour lines and the other three abstract shapes appear as another unit. As a whole, the unit on the left is much larger than the unit on the right. Meanwhile, Ron also explained how his drawing follows a top-to-down and right-to-left direction.

> R: The top is where I started (R sings first three notes of the theme), then I'm going down the page as I go down the piano. That's kind of what the shapes are that were in my mind. (Source: Second hour, semi-structured interview, 9th July 2013)

Through these spatial dimensions, Ron's depiction of the musical stimulus lends evidence to the construction of a corporeal meaning. The order in which Ron's drawing developed suggests that the markings and the abstract shapes were conceived as two separate components[99]. Ron also pointed out that his drawing represented the physical location of the musical notes on the keyboard. He confirms this by singing the first three notes of the melody from the musical stimulus, which corresponds to the top-right corner of the drawing. Using these three notes and the right-to-left directionality as a reference, the top-right corner represents the beginning of the stimulus as how one would play in the higher register of the keyboard. Moving diagonally down towards the left, then, the rest of the drawing represents the middle and the end of the musical stimulus as how one would play in the lower registers of the keyboard. The drawing, then, can be interpreted as Ron's corporeal-based representation of the musical stimulus, where the melody and the harmony are mapped across the topography of the keyboard.

[99] Indeed, the shared Google Docs had shown how Ron first drew the markings from the top-right to the bottom-left, and then went back again to draw the abstract shapes in the same right-to-left direction.

Conceptual analysis: referential, causal, corporeal

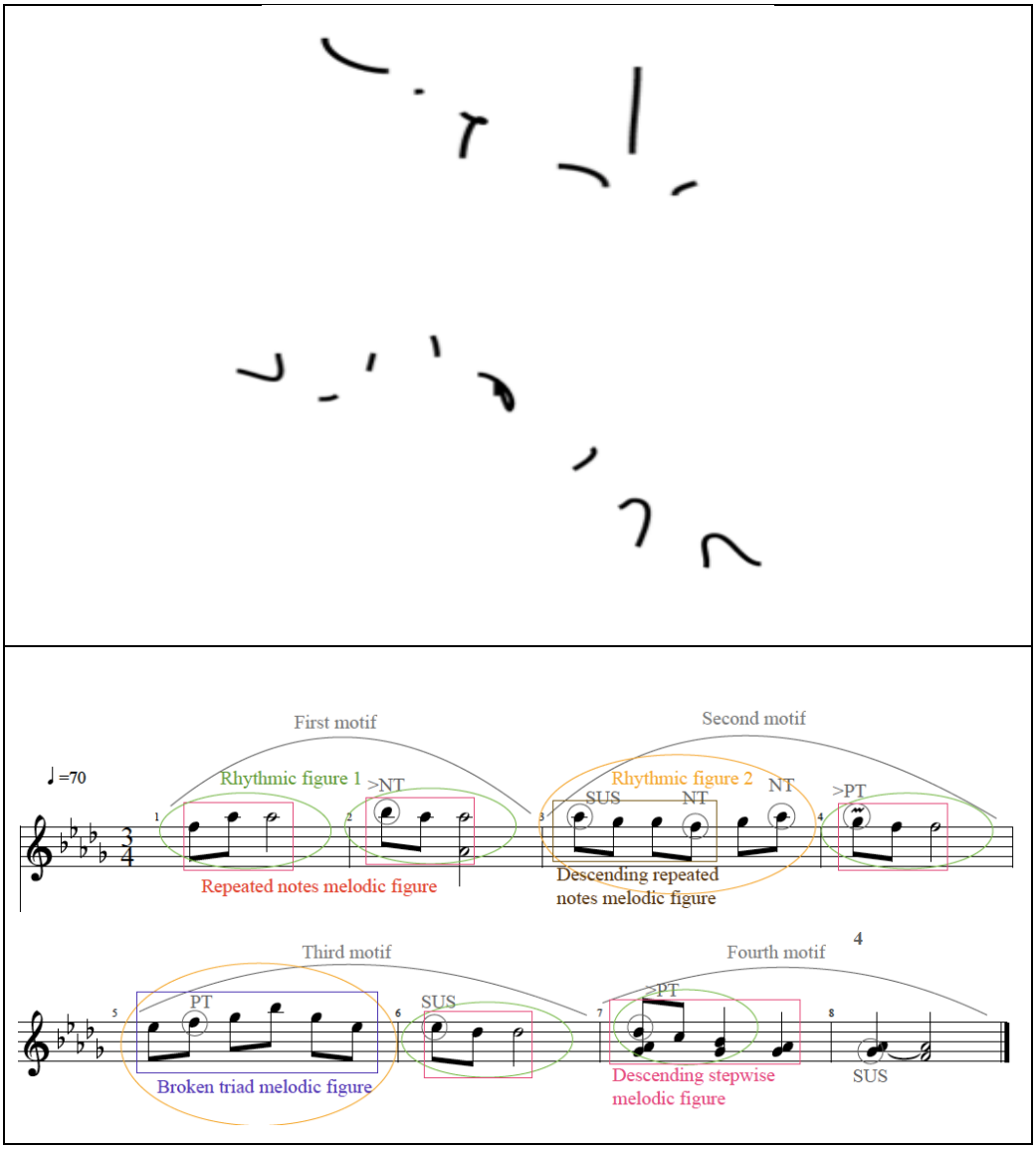
From a conceptual viewpoint, causal and referential (extra-musical) meanings are also present in Ron's drawing[100]. In particular, the causal meanings are evidenced by Ron's depiction of particular notes and chord textures from the musical stimulus.

> R: These are supposed to be little flowers by the way. And then these aren't flowers. These are just maybe the chords being held or something. (Source: Second hour, semi-structured interview, 9th July 2013)

Ron described the abstract lines as "little flowers", which evidence the presence of a referential (extra-musical) meaning. Furthermore, Ron referred to the abstract shapes as "chords being held", showing evidence of a causal meaning being constructed. Together, Ron's associations suggest that the two components in his drawing represent the harmony and the melody from the musical stimulus. While Ron had referred to the abstract lines as 'little flowers', there is also strong evidence to suggest that these markings represent the melody of the stimulus. As table 5.1 shows, the presence of causal and corporeal meanings in the drawing is triangulated by the resemblance in the shape and direction between the abstract lines[101] and the melody in the transcribed excerpt.

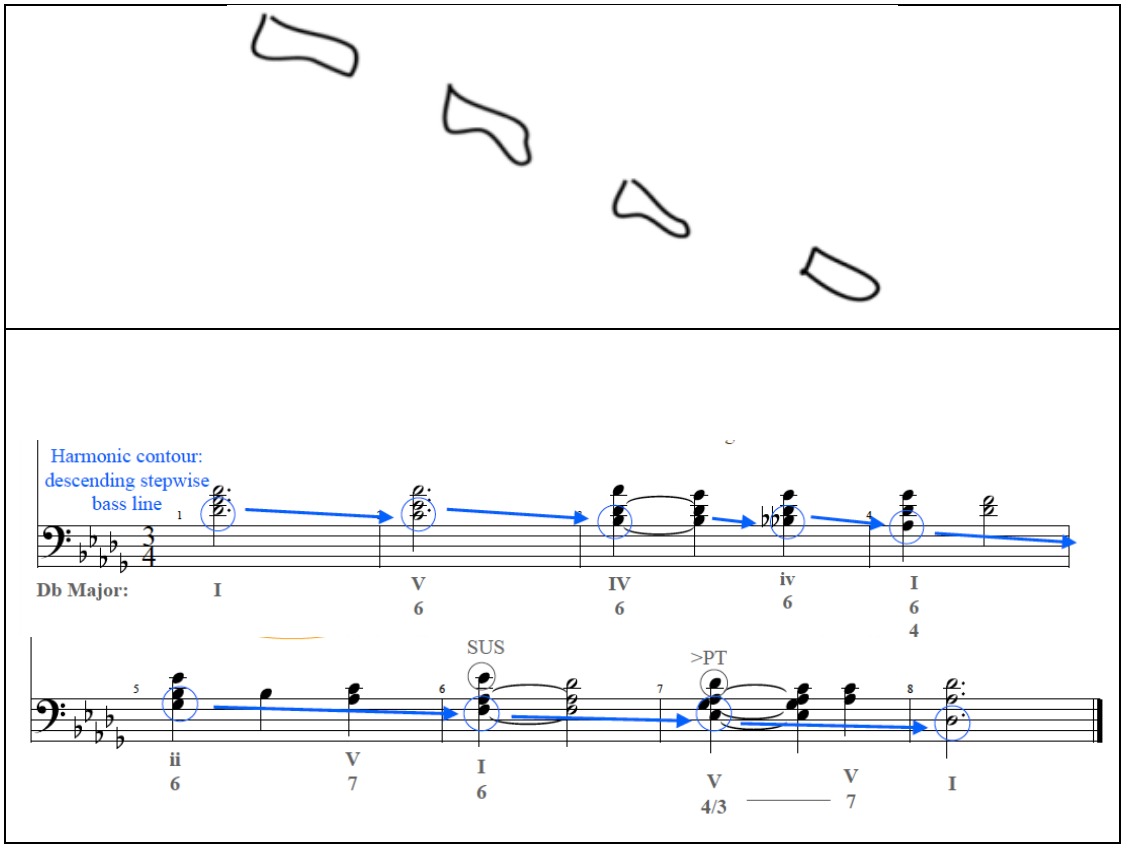
[100] In addition to the referential (intra-musical) and corporeal meanings that were identified earlier in the morphological and structural analysis of Ron's drawing.
[101] Once again, it was necessary to flip the drawing in order to see the relationship, as Ron's drawing represents the musical stimulus in terms of the keyboard topography.

Table 5.1: Drawing of abstract lines with excerpt of melody.



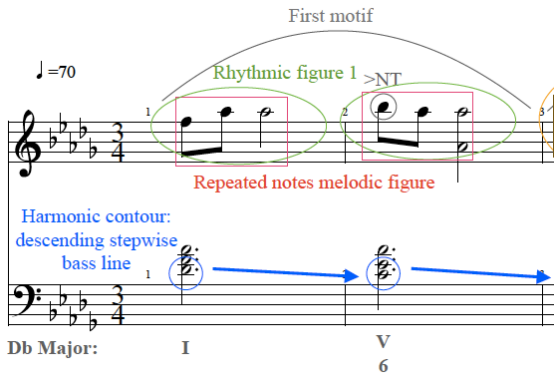
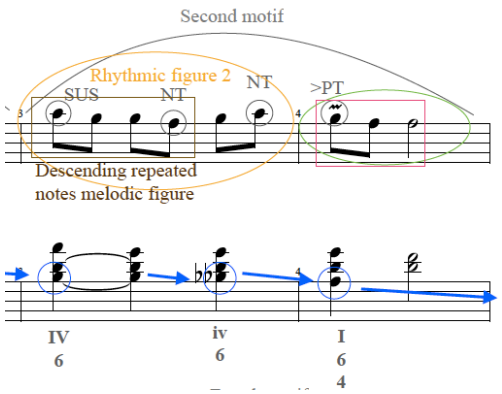
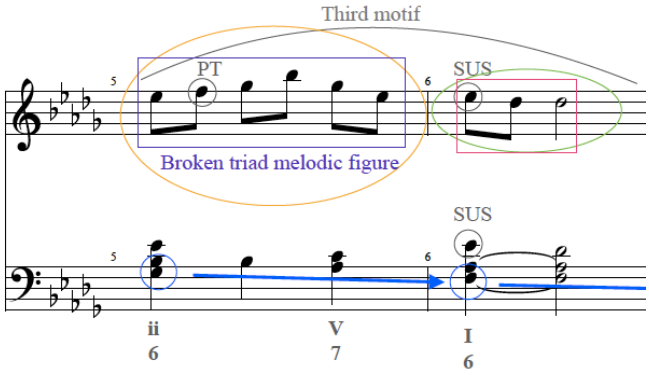
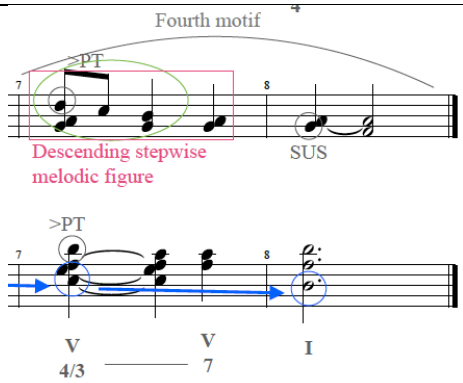
In addition, table 5.2 shows how the presence of causal meanings in the drawing is triangulated by the resemblance between the descending direction of the abstract shapes and the notation of the descending blocked chords in the transcribed excerpt. Once again, the drawing has been flipped to accommodate the perspective of viewing a musical score.

Table 5.2: Drawing of abstract shapes with excerpt of accompaniment chords.



While the abstract lines appear to represent the contour of the melody in great detail, only four abstract shapes are used to represent the chords. It could be argued that the four abstract shapes represent four units of harmonic phrases in the musical stimulus. Table 5.5.3, then, shows how each abstract shape can be interpreted as representing one harmonic phrase that supports the each of the four melodic motives in the musical stimulus.

Table 5.3: Drawing of abstract shapes with excerpts of motives and harmonic phrases.

Bringing this conceptual subsection and thus, the final part of the MSC analysis to a close, Ron's drawing of the musical stimulus falls into Category A (association), Category P (pictogram), Category F (formal response), and Category G (growth). In the case of the first category, the abstract shapes and lines represent Ron's associations to flowers and different sound textures, which evidence the construction of referential (extra-musical) and causal meanings. Next, the second category (P) is shown through the mapping of different musical textures to the keyboard topography. For category F, the drawing indicates a sequence of chronological musical events when all of the components are viewed in a right-to-left direction. Together, these two categories evidence the construction of corporeal meanings in Ron's drawing. Finally, the drawing indicates growth (Category G) and the presence of referential (intra-musical) meanings through the structural organisation of the drawing, which features groupings and common associations within and between individual components. In the following page, figure 5.13 shows a representation of the conceptual analysis of Ron's drawing, in terms of the relationships between the drawn components and the musical stimulus.

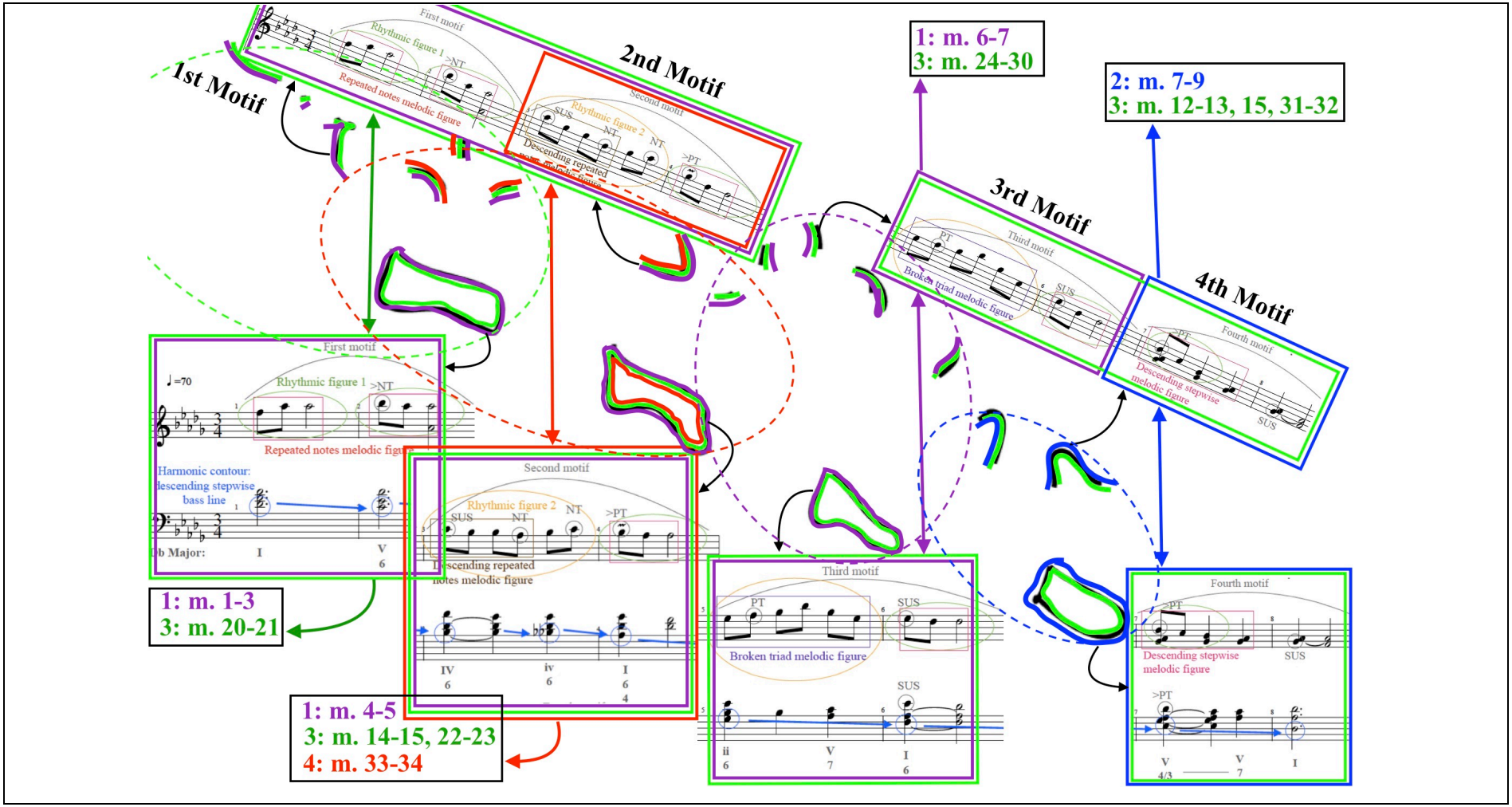


Figure 5.12: Summary of conceptual analysis (Ron's musical stimulus drawing)

Figure 5.13 above shows an annotated version of Ron's entire drawing together with the transcribed excerpts of the musical stimulus. In particular, the melodic motives are mapped above the abstract lines, while the harmonic progressions are mapped below the abstract shapes. In addition, the arrows show how each melodic motive is connected to a particular harmonic progression in the musical stimulus. Meanwhile, the dotted circles divide the drawing into four units to show a holistic view of how the abstract shapes and lines correspond to the melody and the harmony of the musical stimulus. The dotted circles also show the overlapping boundaries between the four units in terms of the motives and harmonic progressions they represent, which were drawn from the analysis presented in tables 5.1, 5.2, and 5.3.

Lastly, the colour coding and the measure numbers show how each part of the musical stimulus (and their drawn representations, as indicated by the dotted lines) are featured in Ron's improvisation and his drawing of it (see figure 5.14). In particular, the numbers 1 (coded in purple), 2 (coded in blue), 3 (coded in green), and 4 (coded in red) refer to particular components from Ron's drawing of his improvisation (see figure 5.15). Meanwhile, the colour-coded measure numbers refer to the specific parts of Ron's improvisation, as well as how they are represented in Ron's drawing of his improvisation (see Appendix A.2). Together, the component numbers and the measure numbers show precisely how Ron featured the musical stimulus in his improvisation, and how his drawings of the musical stimulus and his improvisation are related[102]. Figure 5.13, then, shows that the second and the fourth motives from the musical stimulus are featured much more often in Ron's improvisation compared to the first and third motives, as evidenced by the large number of corresponding measure numbers and colour codes. The multiple relationships between the musical stimulus and Ron's improvisation and both of his drawings will be discussed further in Section 5.2.2 and presented in figure 5.15.

[102] Based on figure 5.13, then, the first motive is featured in components 1 and 3 in Ron's drawing, and in measures 1 to 3 and 20 to 21 in his improvisation (see figure 5.15 and Appendix A.2.1 and A.2.4). Next, the second motive is featured in components 1, 3, and 4 in Ron's drawing, and in measures 4 to 5, 14 to 15, 22 to 23, and 33 to 34 in his improvisation (see figure 5.15 and Appendix A.2.1, A.2.3, A.2.4, and A.2.5). The third motive is again featured in components 1 and 3 of the drawing, and in measures 6 to 7, and 24 to 30 in the improvisation (see figure 5.15 and Appendix A.2.1 and A.2.4). Finally, the fourth motive is featured in components 2 and 3 in the drawing, and in measures 12 to 13, 15, and 31 to 32 in the improvisation (see figure 5.15 and Appendix A.2.2, A.2.3, and A.2.5).

5.5.2 Drawing of improvisation

This subsection focuses on Ron's progressive reflection-based mental representation of his improvisation, drawing from the analysis of the illustration he had produced after his performance. In the following, a morphological, structural, and conceptual analysis of Ron's drawing of his improvisation is presented in three parts. The first part presents a morphological analysis revealing four components in the drawing. This is followed by a structural analysis that reveals a non-linear directionality in the drawing. Lastly, the conceptual analysis shows how each of the four components in Ron's drawing corresponds to his improvisation. In the following figure, Ron's drawing of his improvisation is presented.

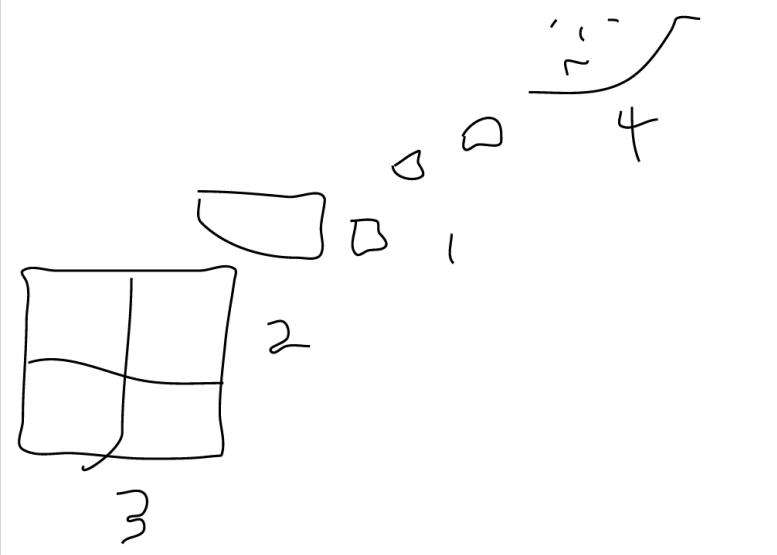


Figure 5.13: Ron's drawing of his improvisation

Morphological analysis: referential, corporeal

From a morphological viewpoint, Ron's drawing of his improvisation shows the construction of referential and corporeal meanings, as evidenced by the patterns of similar shapes and several numerical references. In particular, a referential (intra-musical) meaning is identified by the repetition of the following components: a large square that is split into four smaller squares, several smaller abstract shapes, and several thin lines[103]. The abstract shapes and the thin lines bear a strong resemblance to the ones in Ron's drawing of the musical stimulus.

[103] Out of these components, the square is the largest in size and is located at the lowest point of the drawing. On the other hand, the smallest-sized components are the thin lines on the top-right corner.

Similarly, these components are arranged and spaced out evenly in a diagonal line across the page from the bottom-left corner to the top-right corner.

Additionally, the numbers 1, 2, 3, and 4 beside the components suggest a chronological order in the drawing, lending evidence to the construction of corporeal meanings. The abstract shapes, which are located between the large square and the thin markings, appear to be split into two groups. The first group contains three smaller abstract shapes with the number '1' next to them, while the second group is the larger abstract shape with the number '2' next to it. In the top-right corner, the arrangement of the thin markings comprises four small marks supported by a long curvy line underneath, suggesting that there are two smaller units contained inside this component.

Structural analysis: corporeal, referential

From a structural viewpoint, Ron's drawing of the improvisation also shows the presence of corporeal and referential meanings. As Ron explains, the numbers refer to the order in which the components should be viewed and understood[104], which evidences the construction of corporeal meanings.

> F: So you've actually categorised [your improvisation] into four parts?
>
> R: Yeah, in terms of starting out, then moving down the keyboard and then something else, and then the ending. I think if I listened back to it I could probably come up with more than four, but that's what I remember.
>
> (Source: Second hour, semi-structured interview, 9th July 2013)

Like Ron's drawing of the stimulus, the organisation of the components is also based on the topography of the keyboard. However, unlike the previous drawing, the meanings of the components cannot be understood in one linear direction. Specifically, the numbers first indicate a right-to-left directionality, followed by an immediate return to the far top-right corner.

Meanwhile, the evidence for referential (intra-musical) meanings is seen when Ron's drawing is viewed in the order as specified by the numbers. In particular, the drawing reveals a commonality between several structural components in terms of featuring a gradual increase

[104] This is confirmed from my own observation of seeing Ron draw the components in the following order: small abstract shapes, large abstract shape, large square, and lastly the thin markings.

in size and complexity. By following the numbers, we can see a sequence of the smaller abstract shapes growing into one larger rectangular-like shape, which then expands into a big square with four smaller squares inside. The fourth component, however, is located in the top-right corner, which breaks away from the previous direction of events. In addition, it does not bear any physical resemblance to the first three components, suggesting that it is an isolated unit.

Conceptual analysis: causal, corporeal, referential, representational

From a conceptual viewpoint, causal, corporeal, and representational meanings are identified in Ron's drawing of his improvisation. Based on the following explanation, the relationship between Ron's drawing and his improvisation becomes clear when the order of the components and its reference to the keyboard topography are considered together.

> R: Well this is the beginning of the piece, that's a one. That's the beginning of the piece. Those chords, it wasn't too expansive yet. And then I moved down the keyboard and it got a little richer (writes a 2). And then three was that Shenandoah part. And then up here was the end (writes a 4). (Source: Second hour, semi-structured interview, 9th July 2013)

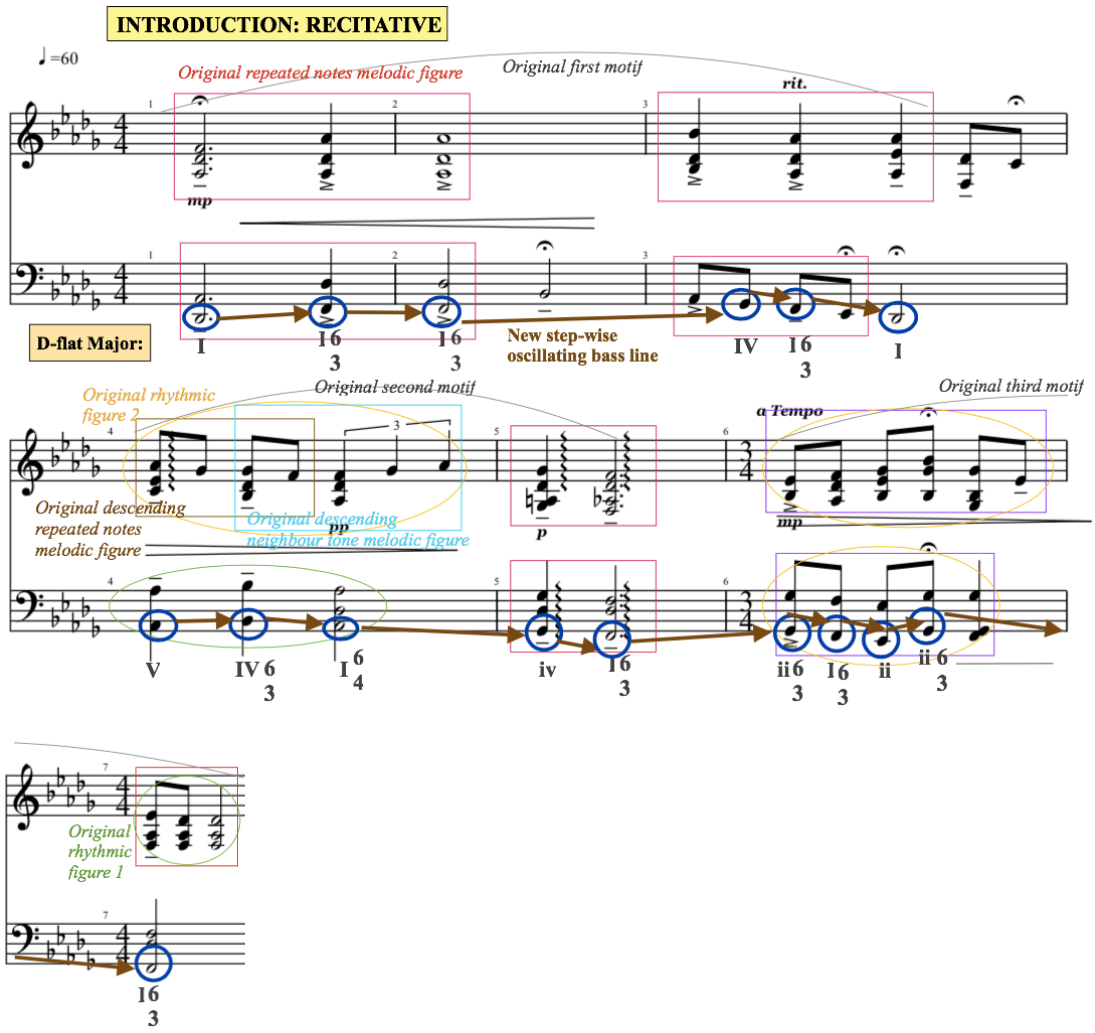
In particular, Ron revealed that his drawing represented his improvisation in three different dimensions of sound, space, and ideas. The first dimension of sound textures suggests the presence of causal meanings, as evidenced by Ron's reference to the expansiveness of the chords. Next, Ron referred to the physical dimension of 'moving down the keyboard', which suggests the presence of corporeal meanings. Lastly, the third dimension of a musical idea, which Ron referred to as the "Shenandoah part", indicates the presence of a referential (intra-musical) meaning.

Furthermore, the presence of these meanings in Ron's drawing is especially evident when each component is viewed together with a transcribed excerpt of his improvisation. Given that Ron was focused on establishing a different "texture and mood" using "Beethoven type" chords at the beginning of his improvisation (see Section 5.4.1), the small abstract shapes in the first component of the drawing appears to correspond to the introductory recitative (see Appendix A.2.1). The transcribed excerpt and the corresponding component are shown together below in table 5.4.

Table 5.4: Drawing of first component with excerpt of introductory recitative.

"Well this is the beginning of the piece, that's a one. That's the beginning of the piece. Those chords, it wasn't too expansive yet."

Introduction: Recitative, (mm. 1-7)



In the above table, Ron's drawing has been flipped to show how the shapes and the positions of the abstract shapes resemble, in three ways, the sound texture and the descending pitch range in the musical transcription. First, the abstract shapes reflect causal meanings in terms of its textural resemblance to the notated blocked chords. In addition, the smaller-sized

abstract shapes reflect Ron's comment of how the chords are not "too expansive yet", as well as the narrow pitch changes heard between these blocked chords. Second, the multiple appearances of these shapes reflect referential (intra-musical) meanings, as they appear to represent the multiple changes in meter and the harmonic progression in the recitative. Third, the descending direction of these abstract shapes reflect corporeal meanings as they resemble the gradual descending melodic shape from A-flat down to D-flat in measures 1 to 7, as explained by Ron.

> F: (Watching R draw the abstract shapes and the square) Do those shapes represent the harmony?
>
> R: More the texture, and maybe the shape of the melody a little bit.
>
> (Source: Second hour, semi-structured interview, 9th July 2013)

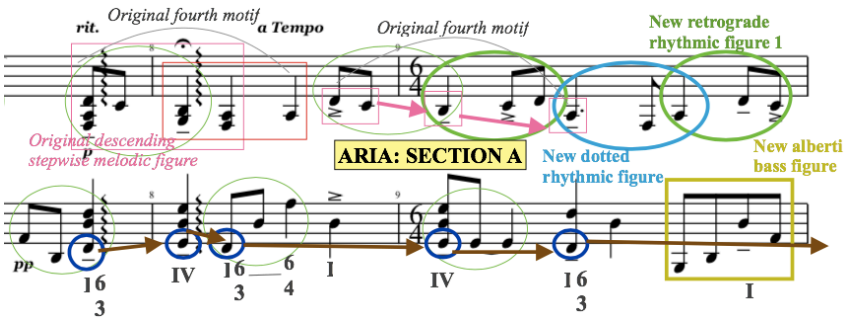
More meanings are evident when the second component is viewed together with the beginning of the first aria (see mm. 7 to 9 in Appendix A.2.2). As table 5.5 shows, the large abstract shape's lower position in the drawing and its representation of Ron "mov[ing] down the keyboard" are triangulated by the appearance of the lowest melodic pitches[105] in the improvisation, thus evidencing the presence of corporeal and causal meanings. The second component also represents a part where the improvisation became a "little richer", which is triangulated by the appearances of new musical ideas in the excerpt, and by several intra-musical ("Shenandoah"), extra-musical ("feeling something from the music"), and corporeal associations ("a fun spot for me"), that Ron had formed at that moment in his performance (see Sections 5.4.2 and 5.4.3).

[105] Specifically, the notes Bb-C-Db-Ab-F-Ab (mm. 9) in the middle range of the keyboard.

Table 5.5: Drawing of second component with excerpt of Aria A.

"And then I moved down the keyboard and it got a little richer (*writes a 2*)."

Aria (A) part one, (mm. 7-9)

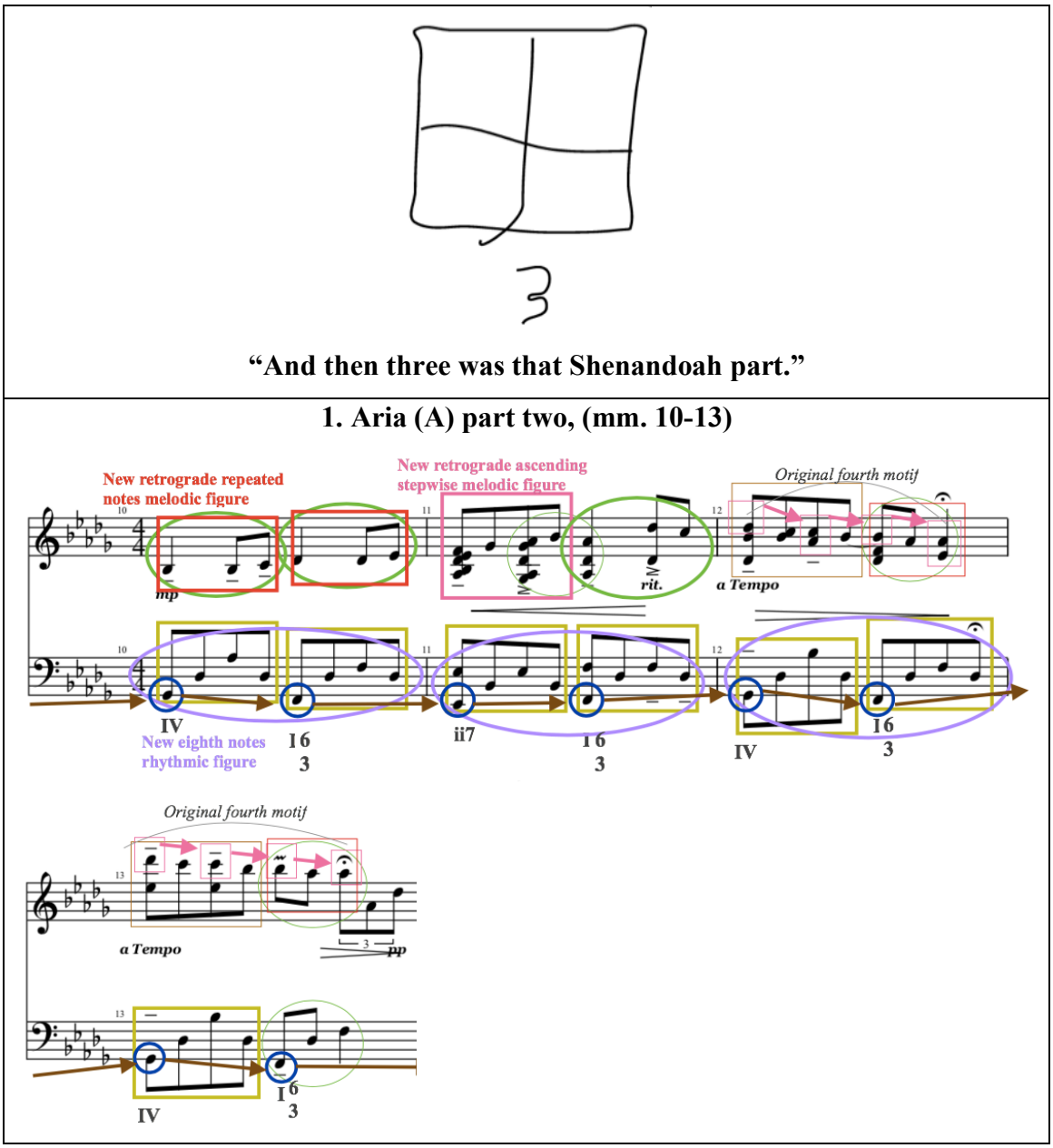


Meanwhile, the large size and the structural symmetry in the third component suggest the presence of referential (intra-musical) meanings. As table 5.6 shows, the four squares seem to correspond to four parts in Ron's improvisation that share similar characteristics. In particular, variations and retrogrades of the original fourth motif appear in aria (A) (mm. 12-13), aria (B) (mm. 15), the reprise (mm. 24-27), and the first part of the coda (mm. 30-32). This commonality between the four Sections is supported by Ron's reference to the third component as "the Shenandoah part". The appearances of the original fourth motif throughout the improvisation is also triangulated by Ron's earlier explanations of how he had "played…a little bit like I was playing "Shenandoah", by "improvis[ing] over the four-note motif [Db-C-Bb-Ab]" (see Section 5.4.3).

Alternatively, the four squares in Ron's drawing can also be interpreted as a representation of the parts in his improvisation that strongly feature the individual developments of four motives from the musical stimulus. As table 5.6 shows, the original first motive is strongly featured in measures 20 to 21 (see also Appendix A.2.4). Next, the original second motive appears in measures 14 to 15 and 22 to 23 (see also Appendix A.2.3 and A.2.4). Meanwhile, an expansion of the original third motive can be seen in measures 24 to 30 (see also Appendix

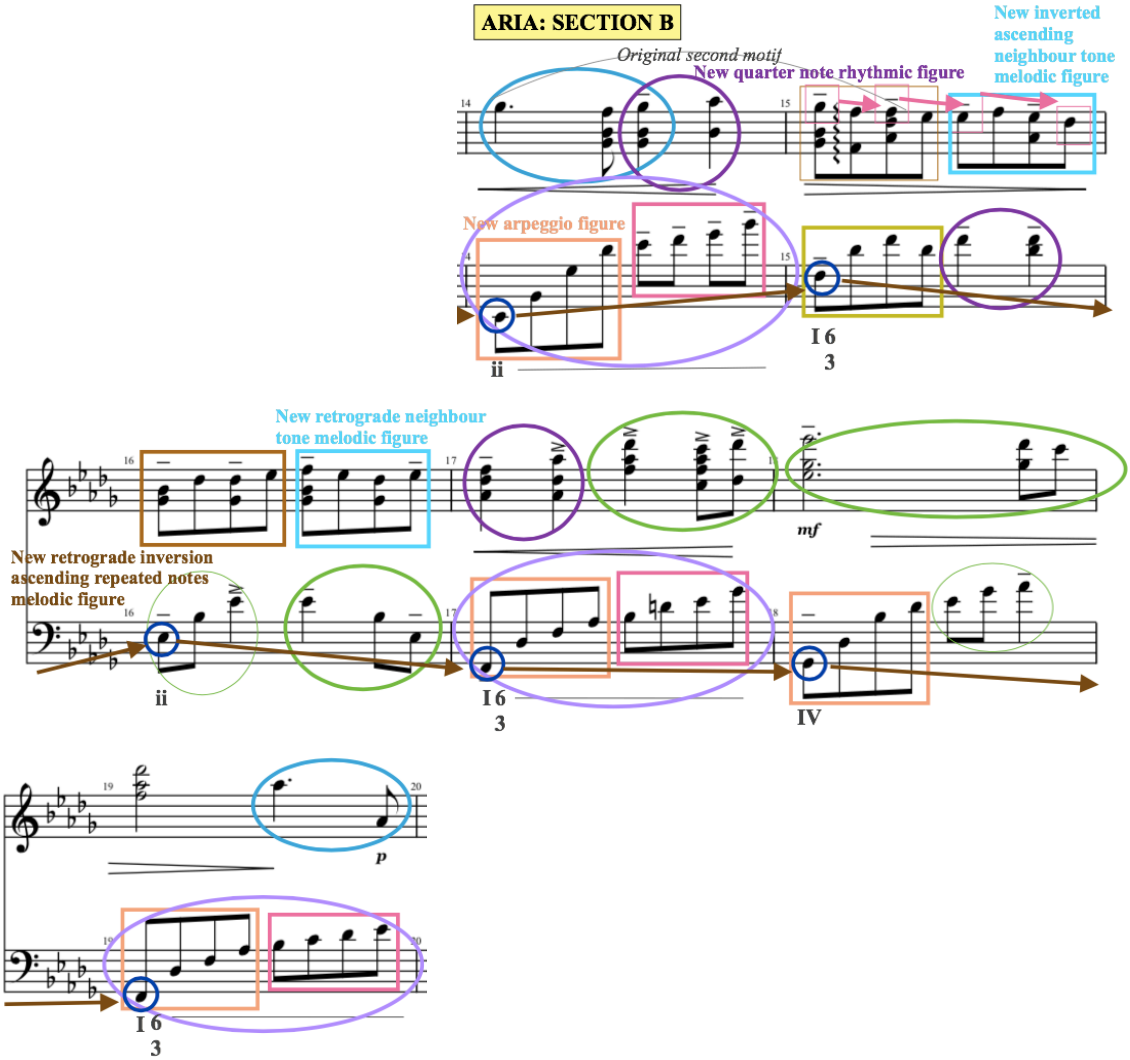
A.2.4). Lastly, the original fourth motive is strongly featured in measures 12 to 13, 15, and 31 to 32 (see also Appendix A.2.2, A.2.3, and A.2.5). These referential (intra-musical) associations between Ron's drawing and his improvisation are triangulated by Ron's earlier explanation of how he had improvised through "free association" where he "came back to other melodies[106] at different times" (see Section 5.4.3).

Table 5.6: Drawing of third component with excerpts of Arias A, B, reprise, and coda.

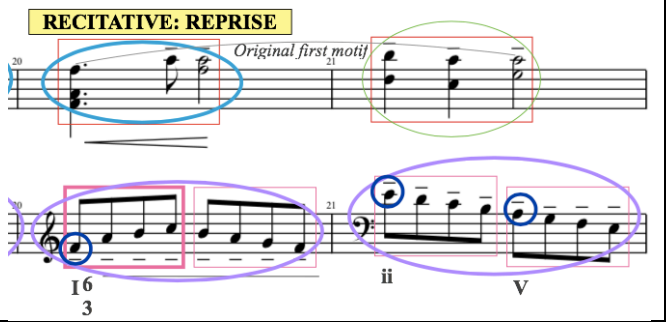


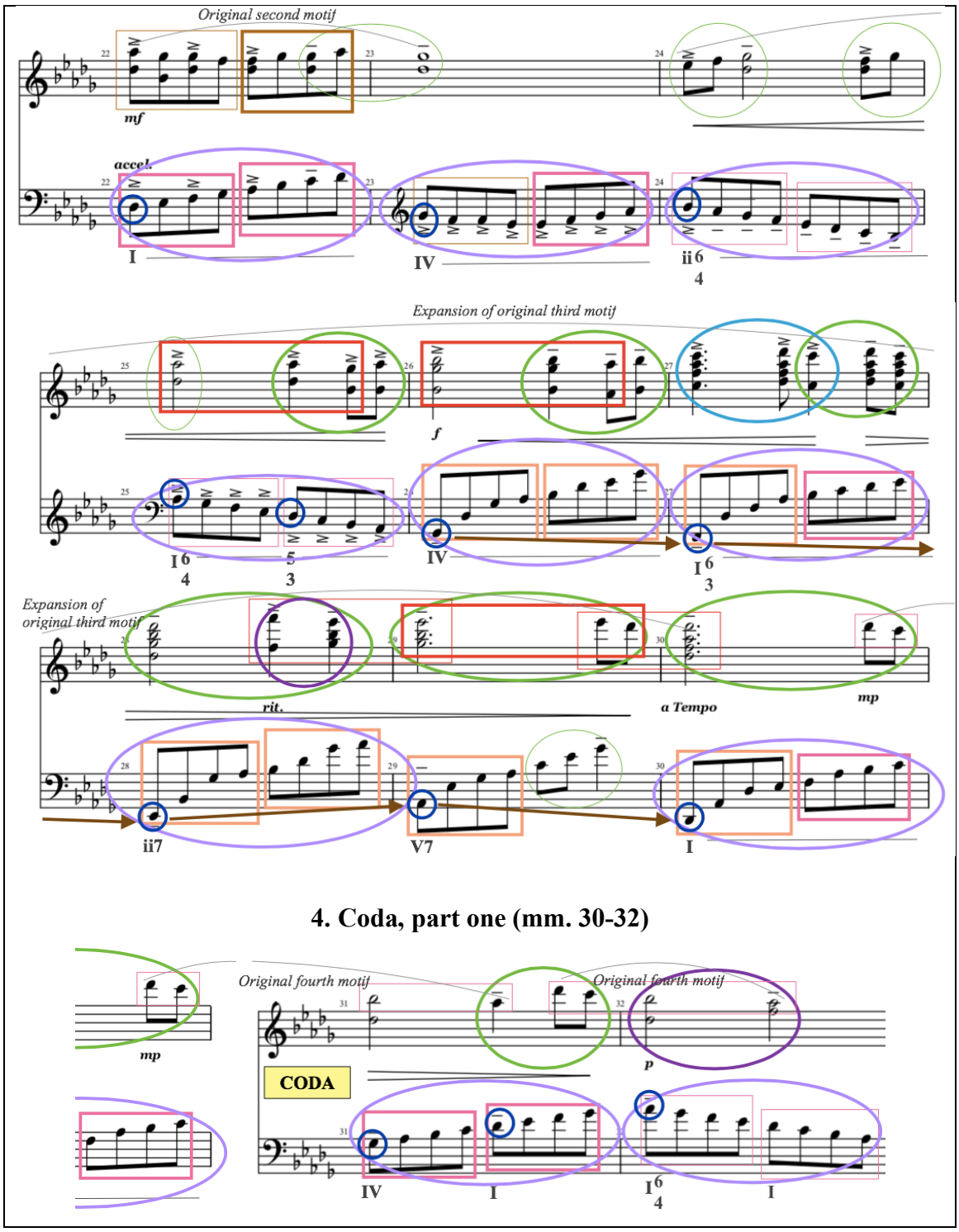
[106] During the retrospective think-aloud protocol, Ron had demonstrated how he had improvised using "free association". In particular, he replayed the melodic notes of the original second motive (Ab-Gb-Gb-F-Gb-Ab-Gb-F-F) from the reprisal Section, and explained how he had "decided to echo it in the left hand".

2. Aria (B) (mm. 14-19)



3. Recitative: Reprise (mm. 20-30)





4. Coda, part one (mm. 30-32)

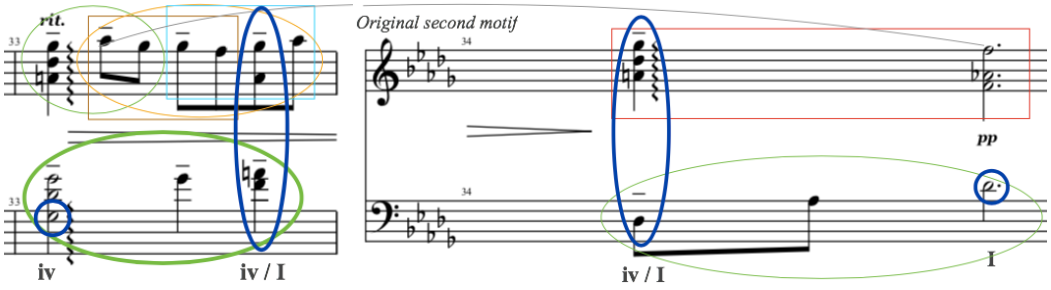
Lastly, the fourth component of the drawing shows the presence of causal and corporeal meanings when it is viewed together with the second half of the coda in Ron's improvisation. As table 5.7 shows, the delicate abstract lines in the fourth component reflect the high pitches of the melody and the thin musical texture in the transcribed excerpt, which evidence the presence of causal meanings. In addition, the position of the fourth component in the upper

right-hand corner of the drawing reflects the actual keyboard topography of the transcribed excerpt, evidencing the presence of corporeal meanings. Furthermore, Ron's explanation ("and then up here was the end") also triangulates the causal and corporeal associations between the fourth component and the coda.

Table 5.7: Drawing of fourth component with excerpt of coda (second half).

"And then up here was the end (*R then writes a '4' underneath*)."

Coda, part two (mm. 33-34)



Bringing this conceptual subsection and thus, the final part of the MSC analysis to a close, Ron's drawing of his improvisation falls into Category A (association), Category P (pictogram), Category F (formal response), and Category G (growth). In the case of Category A, the abstract shapes, the large square, the thin markings, and their repetitions are visual representations of different sound textures and pattern-matching of ideas, which evidence the presence of causal and referential (intra-musical) meanings. Similar to Ron's drawing of the stimulus, the Category P is identified by the mapping of different musical textures in relation to the keyboard topography. For Category F, the numbers in the drawing indicate a sequence of chronological musical events. Together, Categories P and F evidence the presence of corporeal meanings. Lastly, Category G (growth), as well as representational meanings, is evidenced by the structural organisation of the drawing that feature groupings and common associations within and between individual components. In the following page, figure 5.15 shows a representation of the conceptual analysis of Ron's drawing, in terms of the relationship between each drawn component and his improvisation.

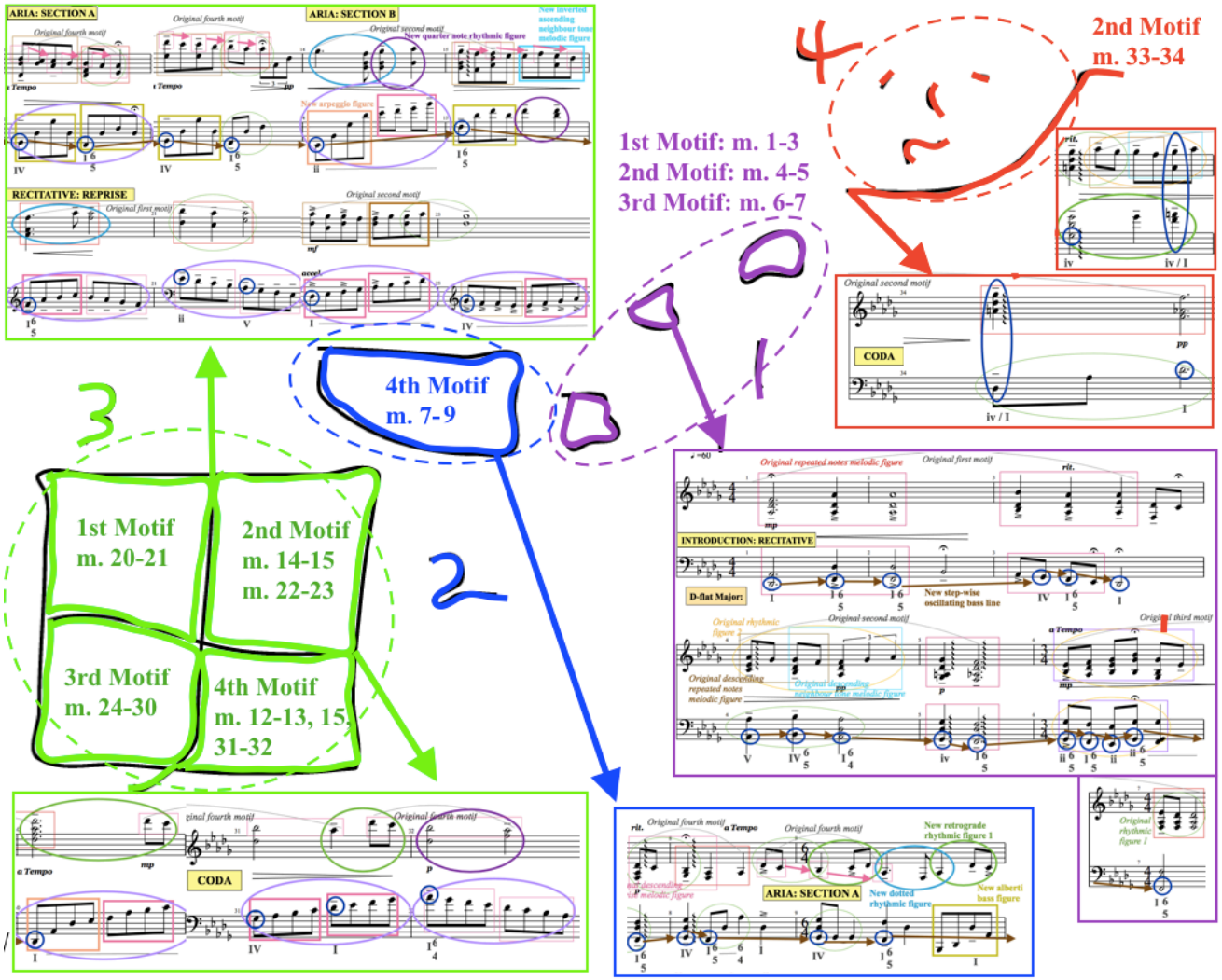


Figure 5.14: Summary of conceptual analysis (Ron's improvisation drawing)

Figure 5.15 above shows an annotated version of Ron's entire drawing together with the transcribed excerpts of his improvisation. In particular, it features the same colour coding system as figure 5.13, and shows precisely how Ron's improvisation features particular elements from the musical stimulus. As figure 5.15 shows, the four components in the drawing is coded in four different colours. Each component also features an arrow that point to the corresponding excerpt from Ron's improvisation, which were drawn from the analysis presented in tables 5.4, 5.5, 5.6, and 5.7. In addition, each component is shown with a list of motives from the musical stimulus, along with the measure numbers indicating where they appear in Ron's improvisation[107]. Furthermore, figure 5.15 also shows that the second and the fourth motives are featured across more components than the first and the third motives, thus triangulating the analysis in figure 5.13.

5.5.3 Summary

To summarise this subsection, during the reflection phase, Ron's drawings show evidence of his formations of a progressive reflection-based mental representation of the musical stimulus, and another progressive reflection-based mental representation of his improvisation. These are shown in the following two figures.

[107] As such, the first component comprising the three small abstract shapes is colour-coded in purple and points to an excerpt of the introductory recitative (see Appendix A.2.1), where the first, second, and third motives are featured. Next, the second component, which is coded in blue, points to an excerpt of the first aria that features the fourth motive (see Appendix A.2.2). Meanwhile, the third component is coded in green and points to excerpts of aria (A), aria (B), the reprise, and the coda (see Appendix A.2.2, A.2.3, A.2.4, and A.2.5), which collectively feature all four motives from the musical stimulus. Finally, the fourth component, which is coded in red, points to an excerpt of the coda that features the second motive.

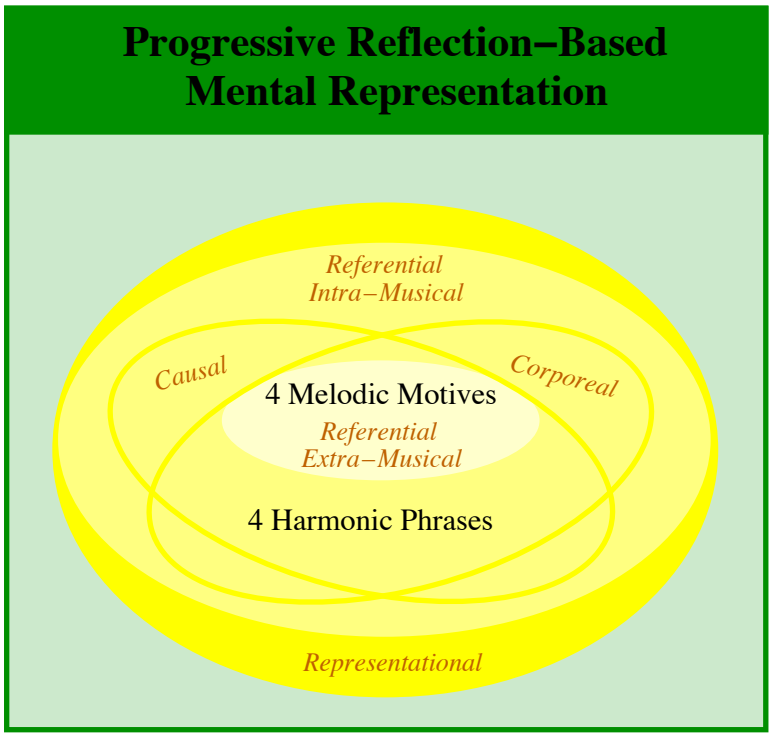


Figure 5.15: Ron's progressive reflection-based representation of the musical stimulus

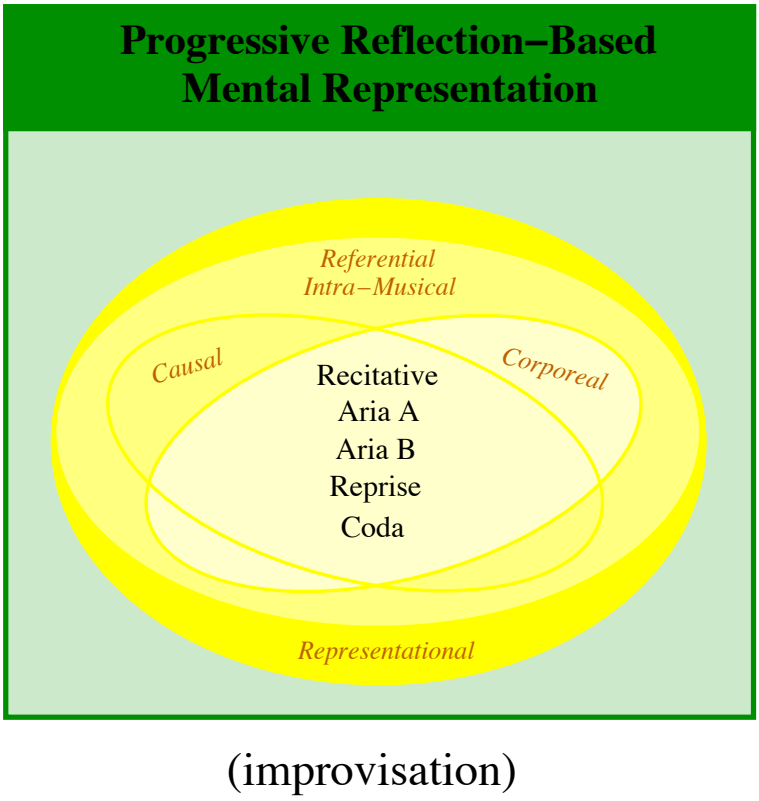


Figure 5.16: Ron's progressive reflection-based representation of his improvisation

As the two figures above show, both progressive reflection-based representations of the stimulus and the improvisation involved Ron's constructions of representational, causal, corporeal, and referential (intra-musical) meanings. However, Ron's progressive reflection-based representation of the stimulus also included the construction of extra-musical meanings that pertain only to the melodic motives. In addition, these meanings are layered, illustrating the multiple dimension of Ron's understandings of the musical stimulus and his improvisation.

5.6 Chapter summary

To summarise, this chapter has presented Ron's mental representations across the four phases of learning, ideation, improvisation, and reflection. Within each phase, different types of mental representations were formed and used. Figure 5.17 below presents a diagram illustrating all the mental representations and their interactions across these four phases.

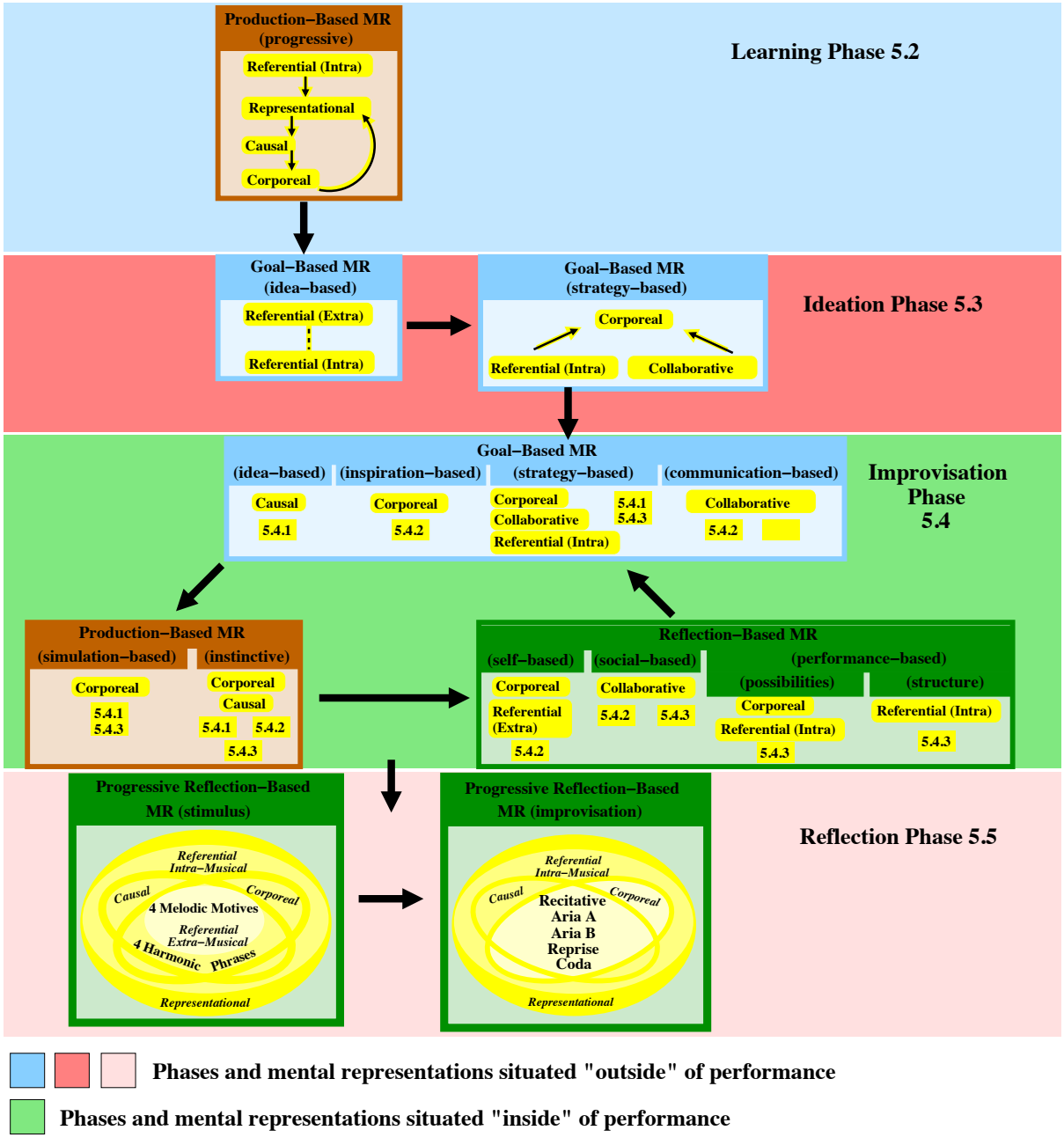


Figure 5.17: Ron's mental representation and meanings across different phases

As figure 5.17 shows, the learning phase is characterised by the formation of a progressive production-based mental representation, where Ron constructed multiple meanings to help him memorise the musical stimulus. During the ideation phase, Ron formed two interconnected mental representations: an idea goal-based representation, and strategic goal-based representation, where, his corporeal meanings held a central role in the ideation process among other constructed meanings. Ron's improvisation phase is characterised by a significant amount of activity in his strategic and idea goal-based mental representations, and drawing from multiple types of feedback through his reflection-based mental representations. Finally, in the reflection phase, Ron formed two progressive reflection-based mental representations that showed his multiple understandings of the musical stimulus and his own improvisation on it.

Part IV: Discussion, Conclusions, Implications, and Recommendations

Chapter 6: Discussion of Findings

This chapter brings together the two descriptive cases from Chapters four and five[108] to present a discussion of the key features of the two professional improvisers' perceived mental representations. To remind the reader, the present study argued for using the concept of perceived 'mental representations' as a lens to trace and understand, through the improvisers' experiences, the progression of goals, ideas, and strategies from the stages of learning, ideation, improvisation, and reflection (see Section 1.3). In addition, the concept of 'mental representations' was conceptualized as embodied structures of meaning making and quasi-perceptual experiential phenomena involving the imagination of events, objects, and settings, where the improviser is the bodily mediator through which such representations are perceived and constructed[109]. The study was thus driven by the following two research questions:

What characterises the nature of improvisers' perceived mental representations before, during, and after a thematic musical improvisation?

1) Drawing on Leman's (2010) framework of "embodied approach to music semantics", how are meanings implicated in the formation of mental representations?

2) How is Lehmann's (1997) model of "acquired mental representations in music performance" evidenced in terms of the roles implicated in their improvisations?

The rest of this chapter is split into four parts, where the following three Sections (6.1, 6.2, 6.3) address each research question by drawing support from the findings and the literature. Section 6.1 discusses the improvisers' experiences in the meaning construction process in relation to their perceived mental representations, thereby answering the first research question. Section 6.2, which answers the second research question, discusses the various types of goal, production, and reflection-based mental representations that the improvisers have formed, and their roles that are situated 'inside' and 'outside' of a musical performance.

[108] Recalling back to chapters four and five, the findings showed how Lehmann's (1997) three types of mental representations and Leman's (2010) six types of semantics are evidenced in the improvisers' various forms of constructed meanings throughout their learning, ideation, and performance phases. In particular, the findings presented an understanding of the experiential aspects that describe *what* 'mental representations' are and *how* they are formed and used. Thus, the scope of the present study is to bring to light, from a phenomenological viewpoint, the precise nature and roles of two professional improvisers' perceived 'mental representations' in the context of thematic-based improvisation, and the specific ways in which they are formed before, during, and after a musical improvisation.

[109] See Section 2.1.2.

These two Sections are then brought together in Section 6.3 to answer the overall research question, where the key features and relationships between the two improvisers' processes of meaning construction, the formation of mental representations, and their various roles are presented in a preliminary model. Section 6.4 closes the chapter with a summary.

6.1 Mapping the formation of mental representations

The key findings that relate to the formation of the two improvisers' mental representations emerged from the analysis of interview, drawings, and music improvisation data. These findings suggested that the improvisers' formations of their mental representations involved the constructions of six types of meanings[110], which lend support to Leman's (2010) framework. The findings also showed that the formation of different types of mental representations informed the constructions of particular meanings, supporting both Lehmann's (1997) model and Leman's (2010) claim that "mental representations are seen as regulatory mechanisms that determine meanings" (p. 44). In particular, the findings provided evidence that improvisers constructed their meanings through four processes: (1) meaning construction, (2) meaning development, (3) meaning revision, and (4) meaning expansion. These processes are presented across the improvisers' learning, ideation, improvisation, and reflection phases in the following four subsections.

6.1.1 Meaning construction

The findings showed meaning construction as a process where the improvisers made sense of their experiences by constructing specific meanings for particular mental representations. In particular, the improvisers constructed their meanings by forming and combining together various associations from their experiences. In addition, the improvisers organised their associations in various ways when constructing corporeal and collaborative meanings. This key finding corroborates with Hall's (1997) assertion that "representation is the production of the meaning…[that] consists of different ways of organising, clustering, arranging, and classifying concepts, and of establishing complex relations between them" (p. 17). Similarly, Dalagna et al. (2013) supports this key finding, presenting "mental representation as a complex relationship between perception, behaviour, environment, and music-making" (p.

[110] To remind the reader, Leman's (2010) six types of musical semantics are: representational, referential intra-musical, referential extra-musical, causal, corporeal, and collaborative (p. 49-55) (see Section 2.1.2).

833). Furthermore, the relationships between the constructed meanings specified the kinds of goal, production, and reflection-based mental representations that are formed, which lend support to Lehmann's (1997) model. As such, the findings provided evidence that meaning construction had occurred in both improvisers' learning, ideation, and improvisation phases.

Constructions in learning: progressive production-based representations

During the learning phase, both improvisers had formed production-based mental representations from memorising and reproducing the musical stimulus. The formations of these mental representations involved the improvisers' constructions of four types of meanings: *representational, referential (intra-musical), causal, and corporeal meanings*. Furthermore, the development of these meanings later on suggested that a type of progressive production-based mental representation was formed[111].

In particular, both improvisers had constructed referential intra-musical meanings to help them memorise the musical stimulus. Stuart, who had correctly recognized the musical stimulus to be the song, "Answer Me", learned by association to the melody and the lyrics (Section 4.2.6). Ron, who did not know the song, learned by forming associations to the first three notes ("Dvorak's New World Symphony") and the last four notes ("Shenandoah") (Sections 5.2.1 and 5.3.1). In addition, both improvisers had constructed representational meanings (e.g. the association to D major) that appeared to influence the constructions of causal meanings (e.g. the ability to imagine and to instinctively reproduce the key). Furthermore, two types of causal meanings were identified, which affirms the properties of causal meanings in Leman's (2010) framework. Stuart's causal meaning, shown by him playing in D major, is abstract in nature as it was constructed by imagining the "activity of agents that might have caused the sonic patterns" (Leman, 2010: 51). On the other hand, Ron's causal meaning, shown by him playing the three notes, was concrete in nature as the "sonic patterns are themselves perceived as agents" (Leman, 2010: 52).

In particular, Stuart and Ron's early constructions of representational (e.g. association to key) and referential intra-musical meanings (e.g. association to other pieces and genres) reflect the way a jazz pianist began to memorise a new piece in a study by Noice et al. (2008). During the first fifteen-minute learning session, the jazz pianist, who was memorising the bebop score

[111] This point will be discussed further in Section 6.2.2.

of *Funk in Deep Freeze* by Hank Mobley, had also established an association to the key as well as the blues harmonic structure. The similar learning strategies of the jazz pianist and the improvisers in this study provide insight into the "'connotations' [that] arise from either hearing or reading a work which evidently calls for formation of images" (Schneider and Godoy, 2001: 21).

For both improvisers, the construction of a corporeal meaning did not occur until the third hearing, after they had learned the first three phrases of the musical stimulus. The creation of corporeal meanings involved combining and organising what they have learned by playing the musical stimulus in order from the beginning. By playing through the musical stimulus in order, the improvisers make what they have learned "significant through body movement and actions" (Leman, 2010: 52). Furthermore, corporeal meanings have a temporal quality that "unfolds in time"; in short, it is constructed by "doing it" rather than "thinking about it" (*ibid*, p. 53). Noice et al. (2008) refers to this type of practice as "integration", where "the pianist first worked on the A Sections and then the B, and then on integrating them" (p. 71). As such, an improviser's construction of a corporeal meaning during the learning phase may indicate that newly learned material is being integrated.

In addition, the improvisers' formations of their production-based mental representations during their learning phase correspond to Berliner's (1994) account of how expert jazz musicians often memorised solos from recordings, with the intent of reproducing their idols' musical expressions in painstaking detail. Furthermore, Stuart and Ron's constructions of representational, referential, causal, and corporeal meanings provide insight into how the knowledge of the jazz musicians in Berliner's (1994) study "includes…differing ways of thinking about and conceptualizing [pieces]" (p. 92).

In terms of Lehmann's (1997) model, the improvisers' learning phases suggest that professional-level improvisers may start with the formation of a unique and complex production-based mental representation when they are memorising a new piece. Although, like Noice et al. (2008), there was no evidence to indicate that goal and reflection-based mental representations were formed during the learning phase, other methodologies different from the one adopted in this study may well show that some improvisers *do* form them earlier. To some degree, there will always be aspects of localized goals and reflections that are present in the learning phase and other contexts, in terms of planning what to learn next and

monitoring the learning progress. It should be noted, however, that the present study was focused on identifying the most prominent mental representations that were formed during this phase.

Constructions in ideation: goal and production based representations

During the ideation phase, both improvisers had formed two mental representations, with at least one that is goal-based. In addition, these two mental representations were interconnected and showed signs of recursive interactions between their constructed meanings. Most importantly, during the ideation phase, both improvisers implemented what Després et al. (2017) calls "preplanning strategies" before improvising (p. 11). From an idea goal-based mental representation, Stuart constructed an intra-musical meaning of "want[ing] to make [the musical stimulus] more romantic" (Section 4.3.1). In this regard, Stuart also demonstrated the use of "atmospheric and stylistic strategies" (*ibid*., p. 11). Meanwhile, from a strategic goal-based mental representation, Ron constructed a corporeal meaning of how to "get away from what [the musical stimulus] did" (Section 5.3.2), thereby "fixing a frame" through the use of constraints (*ibid*., p. 11).

In addition, both improvisers had constructed referential extra-musical meanings after they had learned the musical stimulus. Stuart associated the harmony with emotional feelings like 'light', 'quite pleasant', and 'nothing too worrying' (Section 4.3.2). Meanwhile, for Ron, the musical stimulus created an imagery of "a little field with wild flowers" (Section 5.3.1). Similarly, the jazz pianist in the study by Noice et al. (2008) also constructed an extra-musical meaning in terms of a visual metaphor after he had finished memorising, describing the piece as "purple with lighter blue Sections", with purple representing "the kind of music one might hear in a horror film" (p. 74). The examples from Noice et al. and the two improvisers in this study suggest that professional-level improvisers may construct extra-musical meanings during the later stages of learning new music.

However, the improvisers also showed differences in their mental representation formations. While both improvisers had started with an idea goal-based mental representation that had referential (intra and extra-musical) meanings, their second mental representations differed. For instance, Stuart went on to form a production-based mental representation from which causal and corporeal meanings were constructed (Section 4.3.2). However, Ron formed a

strategic goal-based mental representation, where corporeal, collaborative, and another referential intra-musical meaning was constructed (Section 5.3.2).

The differences between the two improvisers' second mental representations lie in their different approaches in meaning construction. Although both improvisers' corporeal meanings are related to 'experienced' components (Leman, 2010: 52-53, 59) where they describe features of their mental state such attention, focus, challenges, interest, intentionality, and motivation, their construction approaches differed. Stuart, who had encountered difficulties playing in D flat major, had first constructed a causal meaning by thinking of F major, and then constructed a corporeal meaning by playing in this familiar and less difficult key. In doing so, Stuart's thinking in F major was transformed and organised into a physical production of sound, thus establishing what Sudnow (2001) calls the "familiar pathways" on the piano (p. 56). In this case, F major (and later, D major) likely comprises a small part of Stuart's "sizable corpus of such routes…now awaiting syntactic synthesis" (*ibid*., p. 125). Stuart's decision to modulate into new keys also demonstrates a type of "conceptual strategy" (Després et al., 2017: 12).

In contrast, Ron did not start playing immediately and instead described his challenge of how to be different from the musical stimulus. In so doing, he had constructed a corporeal meaning by combining together his previous intra-musical associations, and then organising them into a set of constraints. To an extent, the constraints that Ron has established is similar to how the 1960's free jazz groups had "abandoned meter as a compositional constraint and avoided conventional rhythmic vocabulary" (Berliner, 1994: 337). In addition, Ron had constructed a collaborative meaning. His consideration of the appropriateness of group or solo performance is collaborative in the sense that his meaning had emerged "from musical practices in a social context" (*ibid*., p. 54). Ron's collaborative meaning is of an internal type where "experiences [are transferred] to [potential] energetic forms" (Leman, 2010: 55). By considering what is appropriate for the context and the audience, Ron's collaborative meaning assumes a second person, "me-to-you" relationship (*ibid*., p. 54).

In terms of Lehmann's (1997) model, the recursive relationships between Stuart's goal and production-based mental representations show a similarity to Lehmann's example that illustrates the interactions between expert sight-readers' goal and production-based mental representations. This suggests that at the earliest stages of an improvisation, professional-level

improvisers may adopt a more unrehearsed approach to performance, where they rely on "stored patterns" (*ibid*., p. 143) to handle unexpected situations.

Furthermore, the methodology adopted in this study has enabled the identification of the precise meanings that led Stuart to modify his desired performance goal. These are identified as Stuart's construction of causal and corporeal meanings in his production-based mental representation, as evidenced by Stuart's modulation into F major and thereby modifying his goal to improvise in this new key. Meanwhile, Ron's two goal-based mental representations suggest that professional-level improvisers may sometimes form different types of complex idea and strategic goals before starting the performance. In addition, the fact that both improvisers had formed at least one type of goal-based mental representation during the ideation phase suggests that after memorising new music, the construction of goals may be important before improvising.

Constructions in improvisations: goal, production, reflection representations

Both improvisers had formed goal, production, and reflection-based mental representations that involved the musical stimulus during the improvisation phase. From these mental representations, the following meanings in relation to the musical stimulus were constructed: referential extra-musical, referential intra-musical, causal, corporeal, and collaborative meanings (Leman, 2010). In addition, the improvisers' different treatments of the musical stimulus resulted in distinctive performance structures comprising particular interactions between various types of mental representations.

Furthermore, in contrast to the learning and ideation phases, where a few mental representations of higher complexity were formed, the improvisation phase involved the formation of many types of different mental representations that were less complex. In particular, a mental representation would comprise one or at most two types of meanings, which may reflect the real-time constraints placed on the improvisers' thinking process during improvisation.

The improvisers' different treatments of the musical stimulus

In the present study, the musical stimulus, which is "[c]entral to improvisation", is a "referent" that acted as a "guiding image specific to a given piece, used by the improviser to facilitate the generation…of improvised behavior" (Pressing, 1984: 346). Stuart, who was familiar with

the musical stimulus, had used it as "a musical theme, a motive, a mood…an emotion, [as well as] a story" (*ibid*., p. 346). In particular, Stuart had created an overarching narrative of "a relationship…that's romantic…then in comes tenderness…but mixed with some hurt", a referential extra-musical meaning that he had continued to develop from different types of goal, production, and reflection-based mental representations throughout his improvisation (see Section 4.4). This narrative is likely related to the lyrics of the yearning love song, "Answer Me", which Stuart had identified from the musical stimulus during the learning phase (see Section 4.2.6). Moreover, Stuart formed a type of simulated production-based mental representation to transform his extra-musical narrative into a set of "theme and variations" (*ibid*., p. 348) by simulating various happy and sad emotional states. This production strategy resulted in the repetition and development of the original harmonic and melodic structures (see Section 4.4 and Appendix A.1).

In addition, Stuart formed two other types of production-based mental representations (e.g. instinctive and simulative). The causal (e.g. imagined sound), corporeal (e.g. bodily experience), and extra-musical meanings (e.g. emotional feelings) that Stuart had constructed from these production-based mental representations correspond to Pressing's (1988) notions of "acoustic aspect (produced and sensed sound), the musical aspect (cognitive representation of the sounds in terms of music-technical and expressive dimensions), and the movement aspect (…muscular actions…spatial perception…)…[and] emotional aspects" of an event cluster in his improvisation model (p. 154). Pressing (1984) refers to these aspects as "levels of meaning" in an idea or an event cluster, which is produced from "the player's interaction with the instrument and the performing context" (p. 351-353). In this regard, Stuart's "aspects" represented the "intended form" of an event cluster, because he had constructed these causal, corporeal, and extra-musical meanings before he had played them (see, for example, Stuart's planning and realization of variations nine, ten, and eleven in Section 4.4.3). Furthermore, Stuart's formations of several types of production-based mental representations lend support to Pressing's statement that the "extensive redundancy…between the aspects of each event cluster" (p. 158) results in a "redundancy of…generation [that] allows maximum flexibility of path selection…[and is] considered the most effective strategy for improvisation" (p. 159-161).

At the same time, Stuart's eleven variations and a coda are arranged into a sonata form (Appendix A.1), which give rise to a hierarchical performance structure with components of repertoire selection and associative principles (Clarke, 1988: 9). It is hierarchical in the sense that the music has an overall sonata form and follows a repetitive harmonic and melodic structure. Stuart's improvisation is also associative and repertoire-based in terms of how the development of ideas is driven by the previous variations.

Meanwhile, Ron, who was not familiar with the musical stimulus, was driven by "the goal of the occasion" (Pressing, 1984: 351) to "get away from the [recording]", a corporeal meaning that he had constructed from his strategic goal-based mental representation during his ideation phase (see Section 5.3.2). At the beginning of his improvisation, Ron also constructed both referential intra and extra-musical meanings from his reflection-based mental representations by associating the last four notes of the original melody with the song "Shenandoah" and "a deep feeling…like love" (Section 5.4.2). Thus, Ron had used the musical stimulus as a "guiding…motive", and also as "a mood…[and] an emotion" (*ibid*., p. 346).

Furthermore, Ron formed both simulated and instinctive production-based mental representations to transform his intra and extra-musical meanings into an "ornamented melody" (*ibid*., p. 348) through audiation and by simulating previous performances. Like Stuart, the corporeal and causal meanings that Ron had constructed from his production-based mental representations also lend support to Pressing's (1988) notions of "musical aspects" and "movement aspects" in his improvisation model (p. 154).

Ron's production strategy resulted in a free-form fantasia consisting of two recitatives, two arias, and a coda (Appendix A.2). Ron's improvisation thus has a more associative performance structure with components of repertoire selection (Clarke, 1988: 9). It is associative in the sense that the music has a less defined harmonic structure (Appendix A.2), and that the development of ideas are driven by previous events. It is also repertoire-based in that each of the loosely defined recitative and aria episodes feature at least one melodic component from the musical stimulus in various ways.

Improvisers' Formations of Mental Representations and their Interactions

The way each improviser had treated the musical stimulus in their improvisation also influenced the types of mental representations that were formed and the interactions between

them. Stuart's narrative-driven improvisation involved the formations of two types of goal-based mental representations, three types of production-based mental representations, and four types of reflection-based mental representations (see figures 4.15 and 4.22). As figure 4.15 shows, Stuart focused primarily on two aspects of his narrative-driven improvisation. First, Stuart was particularly engaged in transforming his narrative into musical expressions and implementing them, as shown by the many input, output, and interactions between several production-based mental representations. In particular, Stuart's construction of an extra-musical meaning from his simulated production-based mental representation, where music production involved role playing in different emotions, was an unexpected finding that supports Molnar-Szakacs et. al's (2012) notion of emotional empathy as "a special form of simulation" in music therapy (p. 321).

Second, Stuart was intent on conveying his narrative to the audience, as indicated by many different kinds of feedback into his communication goal-based mental representation from several types of reflection-based mental representations. In particular, Stuart's reflection-based mental representations, which monitored his own experiences and reactions, the musical structure, and his narrative, resonates with Kenny and Gellrich's (2002) short-term, medium-term, and long-term recall (p. 124), and Norgaard's (2008) "evaluative monitoring process" (p. 65).

On the other hand, Ron's idea-driven improvisation involved the formations of four types of goal-based mental representations, two types of production-based mental representations, and four types of reflection-based mental representations (see figures 5.10 and 5.17). As figure 5.10 shows, Ron focused primarily on two aspects of his improvisation. First, Ron made many different decisions to generate and implement musical ideas, as shown by the inputs, outputs, and interactions between several goal-based mental representations. In particular, Ron's strategic, idea, inspiration, and communication goal-based and production-based mental representations corroborate with the multitude of audiation, audience, motor, and idea-based strategies that other improvisers have employed (Després et al., 2017; Hargreaves, 2012a; Norgaard, 2008).

Second, Ron was focused on monitoring various aspects of his performance, as shown by the interactions between several reflection-based mental representations. In particular, Ron's reflection-based mental representations, which monitored for performance possibilities,

performance structure, self-based and social-based (e.g. the audience) experiences resonate with Kenny and Gellrich's (2002) notion of "anticipation" and "flow status" (p. 124), and also with Norgaard's (2008) notion of the "evaluative monitoring process…to identify material for development" (p. 84), as well as the improvisers' own reactions to their playing (p. 67).

Constructions in reflections: progressive reflection-based representations

During the reflection phase, the improvisers' drawings showed their sequential, conceptual, and metaphorical understandings of the musical stimulus and their improvisations, which indicated their formations of a type of progressive reflection-based mental representation. In particular, the improvisers' formation of progressive reflection-based representations involved their constructions of referential (intra and extra-musical), corporeal, and causal meanings.

In the improvisers' drawings, the constructions of these four meanings are reflected in the shapes, textures, and sizes of the illustrated components, as well as the use of direction and repetition. In their drawings of the musical stimulus, both improvisers constructed referential (intra-musical) meanings by using several geometric or abstract shapes to represent the sequence of chords or harmonies, and lines to represent the melody[112]. Similar uses of shapes and lines can be seen in several students' "musical mappings" (p. 1) of a piece in Blair's (2007) study (see p. 8-10). Stuart's drawing emphasised on the major and minor modes of the harmony, while Ron's drawing focused on harmonic phrasing[113]. Furthermore, in the improvisers' drawings of both the musical stimulus and their improvisations, the different sizes and shapes of components reflect changes in the dynamics and musical texture, which indicate their constructions of causal meanings[114]. These causal illustrations can also be seen in students' drawings that used dots and stars to depict staccatos and accents in a piece of music (Blair, 2007: 8). Meanwhile, the descending and ascending directions of the components in all of the improvisers' drawings reflect a physical mapping of the music on the keyboard topography, indicating the improvisers' constructions of corporeal meanings[115]. These corporeal illustrations are similar to how the students in Blair's (2007) study depicted

[112] See the conceptual analysis of Stuart's drawings in Sections 4.5.1 and 4.5.2, and the conceptual analysis of Ron's drawings in Sections 5.5.1 and 5.5.2.
[113] See figures 4.17 and 5.13.
[114] See tables 4.13 and 4.14 for evidence of causal meanings in Stuart's drawings, and tables 5.1 and 5.2 for evidence of causal meanings in Ron's drawings.
[115] See tables 5.3, 5.4, and 5.5 for evidence of corporeal meanings in Ron's drawings, and tables 4.12 and 4.17 for evidence of corporeal meanings Stuart's drawings.

details of "gestural" experiences in their understanding of the *ballet of the unhatched chicks* by Modest Mussourgsky (p. 7). Finally, the heavy use of metaphorical components in Stuart's improvisation drawing reflects many different musical expressions and emotions in his performance, which evidence his constructions of extra-musical meanings[116]. Stuart's depiction of extra-musical meanings resonates with the category of "evocation" in a study by Verschaffel et al. (2009), where children drew "concrete objects or actions…[and] particular feelings or emotions" (p. 267) in their graphical notations of a musical piece.

Thus, the improvisers' constructions of these multiple meanings in their reflection-based mental representations show their multi-layered and sequential understandings of the musical stimulus and their improvisations. These drawings can also be seen as a "musical map [that] provides a frame for reliving [their learning and improvising] experience[s]" (Blair, 2007: 12).

Summary

This section has shown that the processes of meaning construction and mental representation formation occur in both of the improvisers' learning, ideation, improvisation, and reflection phases. During the learning phase, the improvisers constructed referential, corporeal, causal, and representational meanings through a progressive production-based mental representation. The ideation stage similarly involved the construction of multiple meanings through two interconnected mental representations with at least one of them being goal-based. Furthermore, the improvisation phase involved the formation of many types of different mental representations that were less complex and comprised one or at most two types of meanings, which may reflect the real-time constraints placed on the improvisers' thinking process during improvisation. During the reflection phase, the improvisers had constructed referential, causal, corporeal, and representational meanings through their progressive reflection-based representations. From their drawings, they demonstrate a sequential, conceptual, and metaphorical understanding of the musical stimulus and their improvisations.

6.1.2 Meaning development

Meaning development is characterised as a process where the improvisers extend and build on the same type of meaning in a mental representation. It involves the addition of similar associations to a previously constructed meaning. In terms of Lehmann's (1997) model, the

[116] See figure 4.19.

occurrences of meaning development suggest that improvisers' mental representations may become progressively more complex throughout a phase. The following subsections discuss the findings that relate to the process of meaning development as evidenced in the improvisers' learning, improvisation, and reflection phases.

Developments in learning: progressive production-based representations

Both improvisers engaged in meaning development through their production-based mental representations after constructing several meanings from the first hearing. With each successive hearing, the improvisers developed their meanings by adding similar associations into their memory of the musical stimulus. In most cases, the improvisers' development process began with their causal meanings, where they listened to the recording, and then formed a new association to a musical detail (e.g. an ornament) they have not yet learned by instinctively reproducing it on the piano. The process would then continue into the development of the improvisers' corporeal meanings, where they would review the new material by playing, usually in a slower tempo, the entire musical stimulus from the beginning to the end with the new musical detail inserted.

In doing so, the improvisers also developed their representational meanings. By reorganising and integrating the new musical detail into what they have learned, the improvisers are able to keep track of any changes in their conceptual knowledge of the melodic and harmonic structures of the musical stimulus. The processes starting with the development of causal, then corporeal and representational meanings are especially evident during Stuart's fifth and sixth hearings (Section 4.2.6), and during Ron's third, fifth, and sixth hearings (Sections 5.2.3, 5.2.5, and 5.2.6).

Occasionally, the improvisers would develop their representational meanings before other meanings. Instead of immediately reproducing what they have just heard, they would first form a new conceptual association after listening to the recording. This is most evident in Stuart's description of the harmony as a "I-IV-V chord progression…with the odd minor thrown in" (Section 4.2.3, third hearing), and Ron's identification of "D-flat major" (Section 5.2.2, second hearing). This type of developmental learning was also evident during the course of the jazz pianist's two practice sessions from the study by Noice et al. (2008). All of the above examples lend support to Snyder's (2001) statement that "[a]s we form a mental

representation of a piece…each subsequent performance is brought to life by different unrememberable [sic] nuances…this is even true for recordings" (p. 90).

Developments in improvisations: simulated production-based representations

Both improvisers were engaged in the process of meaning development during moments that featured a recurring motive or had marked an important transition in their improvisations. Stuart's referential extra-musical meaning in his simulated production-based mental representation underwent a development between the final climatic variation and the beginning of the soft coda Section. At this point, Stuart's emotionally charged feelings of "I can fight this" developed into a calmer set of introspection: "I've got the drive to carry on…it's time to stop worrying" (see Section 4.4.1). In his improvisation, Stuart's development of his extra-musical meaning in his simulated production-based mental representation resulted in a dramatic decrease in the dynamics, a slowing of the tempo, a sparse musical texture, and softer articulations (see Appendix A.1.11 and A.1.12).

Similarly, Ron's corporeal meaning in his simulated production-based mental representation underwent a development between the introductory recitative and the beginning of the first aria Section. At this point, Ron's simulation of the "slow D-flat chords" (see Section 5.4.1) from his performance in Alaska developed into a simulation of another performance, where he had previously performed an arrangement of the song "Shenandoah" he had written for a high school group (see Section 5.4.3). In his improvisation, Ron's development of his corporeal meanings resulted in a change of musical texture from playing slow, ringing chords to the introduction and development of a four-note motive (see Appendix A.2.1 and A.2.2.).

These processes of meaning development in production-based mental representations are similar to Pressing's (1988) notion of "analytical representations", which consists of three types of "object, feature, and process representations" (p. 158) that "are critical in the representation and generation of [aspects in] event clusters" (p. 161). Here, we recall that aspects are "levels of meanings" that represent a musical event in an improvisation, which can include an "associated emotion" (Pressing, 1984: 353). Thus, Stuart and Ron's constructions of these extra-musical and corporeal meanings represent particular moments in their improvisation.

According to Pressing, analytical representations (objects, features, and processes) "represent all information about the [musical event] needed by the improviser in decision making (p. 154). For example, an "object…is a cognitive or perceptual entity [such as] a chord, a sound, or a finger motion." Features are "parameters that describe shared properties of objects, and 'processes' are descriptions of changes of objects of features over time (p. 154). In the improvisers' case, the objects would correspond to an emotional feeling for Stuart, and the memory of a performance for Ron. In terms of Pressing's model, then, Stuart's feeling of strength (an "object") in variation eleven has developed into *another* feeling (retaining a similar "feature") of resolution (a "process" of change) in the coda. Meanwhile, Ron's memory of a previous performance (object) in the introductory recitative has developed into *another* memory (feature) of a *different* performance (process) in first aria Section. It should be noted, however, that only meanings constructed from production-based mental representations are applicable to Pressing's model.

Developments in reflections: progressive reflection-based representations

The improvisers' set of drawings from the reflection phase showed evidence of meaning development in their progressive reflection-based mental representations. In particular, the improvisers' understandings of motivic or other musical developments are reflected by the use of similar components between their musical stimulus drawings and their improvisation drawings. In addition, these sets of drawings collectively feature the development of referential (extra and intra-musical), corporeal, and causal meanings, as evidenced by how the improvisers "edit" or "giv[e] more detail" to similar components in their improvisation drawings (Blair, 2007: 7).

In Stuart's illustrations, meaning development is particularly evident between the large squares in the musical stimulus drawing (see figure 4.17) and the squares used in the improvisation drawing (see figure 4.19). In particular, the variations between these squares reflect a development of referential (intra and extra-musical) meanings. The development of extra-musical meanings is evidenced by the progression of a "standard square…[that's] all totally in a box" in the stimulus drawing[117], to a "square box" with a "slight variation" in the improvisation drawing[118]. Stuart also emphasises how the "box" in the improvisation drawing

[117] See the morphological analysis in Section 4.5.1.
[118] See table 4.8 from the conceptual analysis in Section 4.5.3.

represents something "that [he was] given…to start with" and "now you do something with it"[119]. In addition, the "standard square" in the musical stimulus drawing[120], which represented "a standard I-IV-V harmonic progression", had developed into a "square box" with a "an arrow to say…there is a little bit of variation in the bass". This development of intra-musical meanings in Stuart's drawings is triangulated by variations one and two in his improvisation, where changes in the original harmonic contour can be seen[121].

In Ron's drawings, meaning development is most evident between the four abstract shapes in the stimulus drawing (see figure 5.12) and the first and second components in the improvisation drawing (see figure 5.14). In particular, the variations between these abstract shapes show a development of referential (intra-musical), causal, and corporeal meanings. The development of intra-musical meanings are evidenced by the progression from the original abstract shapes representing "chords being held" in the stimulus drawing[122], to slightly smaller and larger abstract shapes representing chords that are more "expansive" and "richer" in the improvisation drawing[123]. In addition, the development of causal meanings is evidenced by how Ron uses a larger abstract shape to illustrate the expansion of the chord texture between the musical stimulus and his improvisation. This chord expansion is also triangulated by the larger chord spans that are featured in the introductory recitative (see Appendix A.2.1), compared to the original chords from the musical stimulus (see Section 3.5.2). Finally, the development of corporeal meanings is evidenced by how Ron uses the abstract shapes in both drawings to represent how the music is played on the piano[124].

To summarise, then, the meaning developments in the improvisers' progressive reflection-based mental representations show their understandings of the referential (extra and intra-musical), corporeal, and causal relationship growths between the musical stimulus and their improvisations. In particular, their drawings are unique "musical maps" that represent "a form of narrative", which provide "landmarks and points of meaning" to "tell the story of the creator's experience" (Blair, 2007: 14).

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[119] See table 4.7 from the conceptual analysis in Section 4.5.3.
[120] See the morphological analysis in Section 4.5.1.
[121] See tables 4.7 and 4.8 from the conceptual analysis in Section 4.5.3 and Appendix A.1.1 and A.1.2.
[122] See the conceptual analysis in Section 5.5.1.
[123] See tables 5.4 and 5.5 from the conceptual analysis in Section 5.5.2.
[124] See the structural analysis in Section 5.5.1 (abstract shapes representing "I go down the piano" in the musical stimulus), and the conceptual analysis in Section 5.5.2 (abstract shapes representing "I moved down the keyboard" in the improvisation).

Summary

This section has shown how complex forms of mental representations may be formed by developments in the meanings implicated in their original construction. These can occur during successive hearings of the musical stimulus, reviewing the new material by playing the musical stimulus with the new musical detail inserted, recurring motive and upon important transitions in the improvisation. Meaning development is also evidenced in the improvisers' drawings of the musical stimulus and their improvisation, where the latter feature similar components that are enriched with more details.

6.1.3 Meaning revision

Meaning revision is characterised as a process where the improvisers modify the same type of meaning in a mental representation. In particular, it involves making adjustments to the associations of a previously constructed meaning. In terms of Lehmann's (1997) model, the occurrences of meaning revision suggest that improvisers may sometimes 'correct' their mental representations. The following subsections discuss the findings that relate to the process of meaning revision as evidenced in the improvisers' learning and ideation phases.

Revisions in learning: progressive production-based representations

During the second hearing in their learning phases, both improvisers engaged in meaning revision through their production-based mental representations. After listening to the recording again, the improvisers' representational meanings underwent meaning revision when they realized that they had been played the musical stimulus in a wrong key the first time. In particular, Stuart had noticed a clash after instinctively playing a D major chord alongside the recording, and immediately shifted to playing in D flat major, thereby correcting his association to reflect the new key (Section 4.2.2). Meanwhile, Ron had identified the correct association to D flat major by just listening to the recording and then instinctively reproduced the musical stimulus in the new key (Section 5.2.2). The improvisers' revisions to their representational meanings are similar to those undertaken by a jazz pianist, who also went through a learning process of revision where he sought to "iron out the biases that I have, how I want to play it versus how it's actually written…That's not what the composer wanted" (Noice et al., 2008: 71).

Revisions in ideation: adaptive production-based representation

The findings showed one example where Stuart was engaged in meaning revision during the ideation phase. This is shown by the recursive interconnection between Stuart's idea goal-based mental representation and his adaptive productive mental representation. In particular, when Stuart constructed causal and corporeal meanings by modulating into F major in his production-based mental representation, he also 'revised' his intra-musical meanings of making the music more "romantic" by continuing to play through his initial musical ideas in the new key. To an extent, Stuart's testing of his initial musical ideas by modulating is similar to how a jazz musician had "revis[ed] his mental chart of the progression", during which he was "testing the form by…play[ing] certain phrases" (Berliner, 1994: 180)." On the other hand, the findings did not show evidence of Ron engaging in a revision process, which is likely due to the fact that he did not play on the piano during the ideation phase.

Revisions in improvisations: production-based representations

Interestingly, the findings showed no evidence that the improvisers had actively engaged in meaning revision during the improvisation phase. This is likely attributed to a lack of sufficient data, which is a major limitation in the study's research design. There is in fact strong evidence suggesting that improvisers *do* engage in processes of revisions, which include minor adjustments like adding a note in a phrase or the revision of a passage immediately before its next repetition (Norgaard, 2008; Berliner, 1994). At the same time, Pressing (1984) notes that this applies only to smaller errors, with the correction of more noticeable errors being impossible (p. 354). In this regard, the recordings and the musical analysis did show rare instances where obvious non-harmonic tones had appeared in both improvisations. In Stuart's case, a B-natural had appeared in measure 31 while the improvisation was in F major, while in Ron's case a D-natural had appeared in measure 17 while his improvisation was in D-flat major. The fact that these 'errors' had appeared only once very likely suggests that the improvisers' causal meanings in their production-based mental representations had undergone an immediate revision process after playing those notes.

Summary

This section has looked at how meaning revision takes place in a mental representation where some form of adjustment is made to the associations of previously constructed meaning. Such adjustments may involve changes in the key, which happened in this study when both

improvisers had realised that they played the musical stimulus in the wrong key in the learning phase. Perhaps due to limited data only a few examples of meaning revisions have been discovered in the improvisers' performances, despite strong evidence from the literature that such revisions often take place during improvisations.

6.1.4 Meaning expansion

Meaning expansion is characterised as a process where the improvisers transform one type of meaning into another type of meaning, or, make radical changes to the same meaning. In particular, it involves the formation of radically different associations to a previously constructed meaning. In terms of Lehmann's (1997) model, the occurrence of meaning expansion suggests that improvisers may, at times, change the role of a mental representation. The following subsections discuss the findings that relate to the process of meaning expansion as evidenced in the improvisers' learning and improvisation phases.

Expansion in learning: progressive production-based representations

Both improvisers were found to engage in meaning expansion through their production-based mental representations, especially in the later part of their learning phases. In particular, the improvisers' causal associations to the musical stimulus underwent meaning expansion when they began to improvise a new harmony based on their previous musical memories. In Stuart's case, meaning expansion had occurred during his fourth hearing (Section 4.2.4), where he began to incorporate thicker textures and rock-like rhythms[125] into the original accompaniment. In Ron's case, meaning expansion had occurred during his sixth hearing (Section 5.2.6), where he began to play a completely different harmony[126] under the original melody.

Several studies in the literature corroborate the process of meaning expansion. In the practice of organ improvisation, Johansson (2012) characterises 'expansion' as a form of improvisation that "play[s] with a looser and a more distant relationship" to the original piece, which involves "learning, borrowing and integration of a musical language" from acquired musical knowledge (p. 225). Similarly, the expansion of causal meanings is also evident in

[125] A review of Stuart's public Youtube recordings also show that he often used similar textures and rhythms in his improvisations.
[126] In particular, the improvised harmony reflected the same chord progression from the beginning of the second movement in Dvorak's ninth symphony, from which Ron had earlier formed an intra-musical meaning to the musical stimulus (see Ron's first hearing).

Derek's learning process in Ockelford's (2012) study. Derek, who is a prodigious musical savant and an accomplished piano improviser, had learned an especially difficult jazz piece by ear over the course of four years. The musical stimulus was meant to be challenging for Derek in order to observe how he creatively approached the memorisation of the piece. Among other findings, Ockelford (2012) reports how Derek had created his own version of the piece that "comprised…memories of fragments and features from other pieces" (p. 49). Thus, Stuart, Ron, and Derek's learning approaches suggest that improvisers may learn new music creatively by "borrow[ing] material from other pieces…a technique that is characteristic of traditional jazz" (*ibid.*, p. 45).

Expansion in improvisations: simulated production-based representation

In variation four (see Appendix A.1.4), Stuart engaged in meaning expansion through a simulated production-based mental representation. During this moment, Stuart's extra-musical feelings of "something very upsetting" had expanded into a new *corporeal* association: "change[s] in body language, and tears" (see Section 4.4.2). As such, Stuart's meaning expansion led to a modulation from F major into D minor in measure 27. The process of meaning expansion is similar to Pressing's (1988) notion of an "interrupt generation", where "analytical representations (objects, features, processes)" are reset, thus "bring[ing] to an end a sequence of related event clusters" (p. 157). Furthermore, Pressing provides an example where this resetting process results in the introduction of a new motive that has no relation to the previous motive (p. 164). In terms of Pressing's model, then, Stuart's expansion of his *emotional feeling* (e.g. "something very upsetting") into a *new perceptual experience* ("e.g. changes in body language, and tears") is similar to the resetting of an analytical representation. In other words, the process of meaning expansion has led to an "interruption" in Stuart's improvisation – in this case, the end of F major and the introduction of D minor.

Expansion in reflections: progressive reflection-based representation

The improvisers' set of drawings from the reflection phase showed evidence of meaning expansion in terms of how their understandings of particular ideas are transformed in various ways throughout an improvisation. In particular, certain components in both improvisation drawings underwent radical changes in their sizes, shapes, and textures, indicating a transformation of meanings in their progressive reflection-based mental representations.

These changes in the improvisation drawings show evidence in the expansion of referential (extra and intra-musical), corporeal, and causal meanings, and reflect changes in the music that the improvisers themselves "notices and attends to" (Blair, 2007: 6).

In Stuart's improvisation drawing, the expansions of referential (intra and extra-musical), corporeal, and causal meanings can be seen in the progressive transformations of the second square-shaped component, which is located on the left (see figure 4.17). In particular, this second "square box" first transforms into two black boxes, which are located at the bottom of the drawing, and then reappears again as "square shoes" (as described by Stuart) walking up the stairs[127]. In addition to Stuart's descriptions and their geometric similarities, this square component and each of its transformed appearances corresponds to a variation where a triplet motive is featured[128][129]. Furthermore, Stuart's understandings of these components are radically different, involving a range of referential associations ("square box, slight variation"), extra-musical associations ("anxiety, blackness"), and corporeal associations ("feet walking up"; "square shoes"; "up the steps")[130]. The increasing size and complexity of these components also reflect an expansion of causal meanings in terms of the increasing dynamics and thickness of musical texture in the variations they represent. Thus, these meaning expansions in Stuart's progressive reflection-based mental representation drawing reflect his referential (intra and extra-musical), corporeal, and causal understandings of the triplet motive.

In Ron's improvisation drawing, the expansion of referential (intra-musical), corporeal, and causal meanings are evidenced by the progressive transformation between the first three components. In particular, the first and second components merge together to transform into the third component (see figure 5.15). The expansion of intra-musical meanings is evidenced by how the first component represents the appearances of the first three motives[131]; by how the second component represents the appearance of the fourth motive[132]; and by how the third

[127] See the conceptual analysis in Section 4.5.2.
[128] This triplet motive, which was created by Stuart's, is featured in variation two (which corresponds to the second square), variation eight (which corresponds to the two black boxes), and variations nine to eleven (which corresponds to the square shoes).
[129] See the conceptual analysis in Section 4.5.2 and Appendix A.1.2, A.1.8, A.1.10, A.1.11 (in particular, the triplet motives are located in mm. 11-12, 47-48, 50-51, 65, 69, 71-76).
[130] See tables 4.7, 4.11, 4.12, 4.13, and 4.14 in the conceptual analysis of Section 4.5.2.
[131] See table 5.4 from the conceptual analysis in Section 5.5.2.
[132] See table 5.5 from the conceptual analysis in Section 5.5.2.

component represents the appearances of all four motives[133]. Meanwhile, the expansion of corporeal meanings is evidenced by the descending positions of these three components that represent Ron "moving down the keyboard"[134]. Lastly, the increasing size and complexity of these three components also reflect an expansion of causal meanings in terms of the increasing dynamics and thickness of musical texture in the introductory recitative, arias A and B, and the reprise[135]. Thus, these meaning expansions in Ron's improvisation drawing reflect his referential (intra-musical), corporeal, and causal understandings of the four original motives from the musical stimulus.

To summarise, the meaning expansions in the improvisers' progressive reflection-based mental representations show their multimodal understandings of how their ideas are transformed sequentially in their improvisations. The improvisers' drawings are also capture accurate details of the musical stimulus and their improvisations, unlike the musical representations drawn by a child in Barrett's (2000), which showed "inconsistencies between the musical complexity of Gemma's invented songs and the textual focus of her notations" (p. 59). Furthermore, the selective transformations of specific components in the improvisers' drawings represent particular changes in the improvisations that are "important to them" and that they perceive as "meaningful during their musical [experiences]" (Blair, 2007: 12).

Summary

This section has looked at the meaning expansion process, which may involve changes to the same meaning as well as more radical cases, where one type of meaning is transformed into another. This leads to the formation of different associations to previously constructed meanings, which at times may change the role of mental representation. Musically, this may be reflected in the incorporation of thicker textures, rock-like rhythms and new harmonies. Visually, this can be exhibited by radical changes in sizes, shapes, and textures. More complex cases involve the transformations of one or more drawing components.

[133] See table 5.6 from the conceptual analysis in Section 5.5.2.
[134] See the structural and conceptual analysis in Section 5.5.2.
[135] See Appendix A.2.1 to A.2.4.

6.1.5 Summary

In summary, this section has discussed the key findings that relate to the improvisers' formations of their perceived mental representations. Figure 6.1 shows a visual representation of two interlinked processes: (1) the improvisers' mental representation formation process, and (2) the improvisers' meaning construction process.

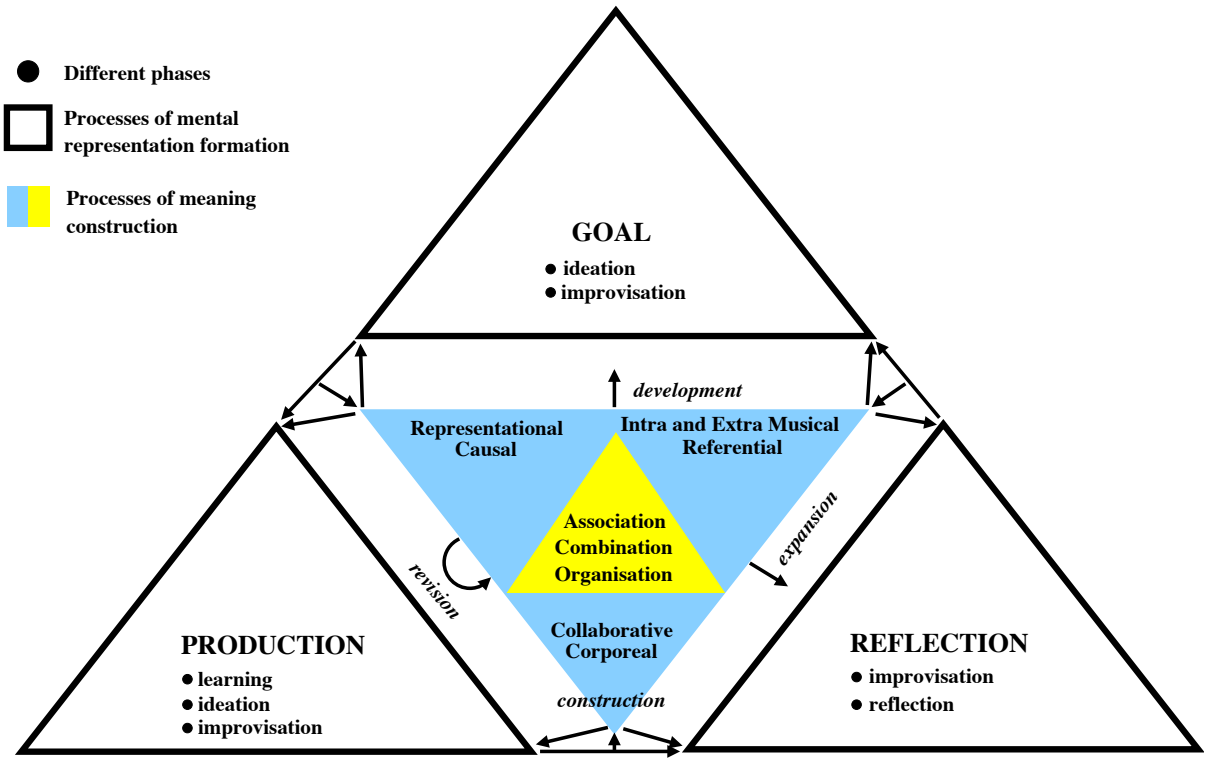

Figure 6.1: Processes of mental representation formation and meaning constructions

As figure 6.1 shows, throughout the learning, ideation, improvisation, and reflection phases, the improvisers formed, through their intentions, different kinds of goal, production, and reflection-based mental representations. The interactions between the improvisers' mental representations are drawn from the findings in Sections 4.4. and 5.4 (see figures 4.15 and 5.10). From these mental representations, six types of meanings (Leman, 2010) were constructed: representational, referential intra-musical, referential extra-musical, corporeal, and collaborative meanings. In particular, the improvisers constructed their meanings by associating, combining, and organising their experiences. After their construction, meanings may continue to undergo development, revision, and expansion in various phases.

6.2 Identifying the roles and types of mental representations

The key findings that relate to the roles of the two improvisers' perceived mental representations emerged from the analysis of interview, drawings, and music improvisation data. These findings showed evidence that the two improvisers used goal, production, and reflection-based mental representations, which lend support to Lehmann's (1997) model. Furthermore, the findings provided evidence for the improvisers' uses of *four types of goal-based mental representations*, *four types of production-based mental representations*, and *four types of reflection-based mental representations*. Each type of mental representation played particular roles that had a global or local influence throughout each of the four phases. In addition, the learning, ideation, and reflection phases represent moments when the improvisers' mental representations were used 'outside' of a performance, while the improvisation phase represents moments when they were used 'inside' of a performance. This section, then, presents twelve types of mental representations across three categories (goal, production, and reflection), as evidenced by the findings from the improvisers' learning, ideation, improvisation, and reflection phases.

6.2.1 Four types of goal-based mental representations

The first category comprises four types of goal-based mental representations. In particular, this subsection focuses on the roles of the following types of goal-based mental representations: (1) strategy-based, (2) idea-based, (3) inspiration-based, and (4) communication-based. These different types of goal-based representations had particular decision-making roles that functioned at a global or a local level, as well as 'inside' and 'outside' of a performance. Global goal-based mental representations are defined as decisions that have a long-term influence on the entire improvisation. On the other hand, local goal-based mental representations are defined as decisions that have a short-term influence on the improvisation. Furthermore, goal-based representations that are situated 'inside' of performance, resonate with Davidson and Scripp's (1992) notion of "reflection in performance", where the improvisers "transform a set of actions through…reconfiguring…expressive nuance[s]" (p. 396). Meanwhile, goal-based representations that are situated 'outside' of performance, resonate with the notion of "representation as reflection", where the improvisers "identif[y]…solutions to problems or formulat[e]…judgements through critiques…metaphors, and…strategies" (*ibid*., p. 396).

Strategy-based goals (inside and outside of performance)

Strategic goal-based mental representations played a variety of global and local roles within and outside of the improvisers' performances. In particular, the improvisers used them to monitor their improvisations, for pre-planning before the improvisation, as well as to establish flow and performance constraints. Additionally, strategic mental representations mostly involved the improvisers' constructions of corporeal and referential (intra-musical) meanings, and occasionally, collaborative meanings.

At a global level, the improvisers' strategic mental representations provided general goals of implementing their improvisations in a particular musical direction. During his efforts to establish flow in his improvisation, Stuart's strategic representations included a corporeal-based goal to "let go", and an intra-musical based goal to "take [his improvisation] a bit deeper" (see Section 4.2.2). The influences of these implementation strategies can be seen over variations one to three, and variations four to eight (see Appendix A.1.1 to A.1.8). Likewise, Ron's strategic representations, which he had formed while establishing performance constraints, included corporeal-based goals to "improvise over the four-note motif", and directing the momentum of the music (see Section 5.4.3). Ron's development of the fourth motive demonstrates what Pike (1974) calls an act of "prevision", where Ron "grasps… developmental possibilities [of the motive]" (p. 89). The influences of Ron's strategic goals can be seen over both arias and the reprise (see Appendix A.2.2 to A.2.4). This is similar to Norgaard's (2008) notion of "sketch planning", where improvisers would sketch out "upcoming passages" or "an entire Section" (p. 62-63).

Furthermore, Ron's corporeal, intra-musical, and collaborative based goal to improvise "differently, in terms of texture and mood", which he had pre-planned in response to a "challenge" during the ideation phase (e.g. outside of performance), appeared to influence the whole improvisation (see Sections 5.2.2, 5.4.1, and Appendix A.2). To an extent, these global strategic mental representations correspond to a study by Després et al. (2017), who also reported the use of "atmospheric and stylistic strategies" from Western classical expert improvisers (p. 15).

At a local level, strategic mental representations provided specific goals of implementing a particular strategy at a precise moment during the improvisation. In particular, Stuart used strategic representations for three precise moments while he was monitoring his improvisation.

In variation eight, Stuart formed a corporeal-based goal to "try anything to enjoy myself" (see Section 4.4.4.), which resulted in his creation of the triplet motif (see mm. 47 to 52 in Appendix A.1.8). As such, Stuart demonstrated what Finney (1987) calls "a primal trust in the body as a source of knowing" (p. 23). In a sense, this is also similar to how an improviser in Norgaard's (2008) study "used physical movements" to "guide note choices" (p. 124), or to Hargreaves' (2012a) notion of "motor-generated ideas", where the improviser's "movement is the primary unconscious trigger" (p. 9). Després et al. (2017) also reported improvisers' uses of "real-time strategies" involve "using the unexpected creatively" (p. 15).

In variation nine, Stuart formed an intra-musical goal to "repeat [a] motif" (see Section 4.4.4), resulting in the reappearance of the original first motif (see red box in mm. 58, Appendix A.1.9). Likewise, the "incorpora[tion] [of] material played earlier" was also employed by one of the improvisers in Norgaard's (2008) study (p. 101). At one point, Stuart combined a strategic representation with another communicative goal-based representation (see later in this section) to form a collaborative goal of "keep[ing] the communication interesting", "let's have a contrast", and "let's change the course of [the music]" (see Section 4.4.3), which resulted in the creations of variations ten and eleven (see Appendix A.1.10 and A.1.11). Similarly, the use of a "contrasting approach" is also present in the study by Després et al. (2017: 14).

Idea-based goals (inside and outside of performance)

Idea goal-based mental representations played both a global and a local role. In particular, the improvisers used them to generate ideas prior to and during their improvisations, especially as a way to establish performance constraints. Additionally, idea-based mental representations mostly involved the improvisers' constructions of referential (intra-musical and extra-musical) meanings, and occasionally, causal meanings.

At a global level, idea goal-based representations provided the improvisers with a mood or a musical style as an overall starting point for their improvisations during the ideation phase (e.g. outside of performance). These types of idea-based representations lend support to the notion of "preplanning strategies" in the study by Després et al (2017), where improvisers make "musical decisions…before the improvisation" (p. 11). Stuart's idea-based representation included an extra-musical goal of conveying "pleasant" and "light-hearted" moods, and an intra-musical goal of "mak[ing] it more romantic" and "minor" (see Section

4.3.1). In particular, it is supported by Sawyer's (1992) notion of "musical style" as the "third level of ideation" (p. 258). The influences of the first goal can be seen over variations one to four, while the influences of the second goal can be seen over variations four to eight. Ron's idea goal-based representation also involved intra-musical associations to the song "Shenandoah" and "Dvorak's New World Symphony", as well as extra-musical associations to a "little field with white flowers" (see Section 5.3.2). In particular, Ron's intra-musical associations are an example of "intuitive cognition", where he "brings a[n]…idea into being…[by] grasping…its individual structure" (Pike, 1974: 89). The influences of these ideas can be seen throughout Ron's entire improvisation, especially in the development of the fourth motive (see Appendix A.2.2 and A.2.5) and a general 'pastoral' mood. These global idea-based representations once again support other expert improvisers' uses of "atmospheric and stylistic strategies" (Després et al., 2017: 15), as well as the use of "ideas that contain only very abstract information such as architectural shapes or stylistic features" (Norgaard, 2008: 70). In addition, the fourth motive is considered a "productive tonal image", where Ron "combined previously acquired data into new imaginal unities" (Pike, 1974: 88).

At a local level, these representations provided more specific musical ideas for the improviser to incorporate at a particular point in his improvisation. In particular, Ron used idea goal-based representations twice. In the introductory recitative, Ron formed an intra-musical goal to play a "Beethoven type" introduction with the low D-flat major chords (see mm. 1 to 3 in Appendix A.2.1). Ron also formed causal-based goals twice, which involved him "hear[ing] the iv chord in my head" during the introduction and the coda, and decided to play the minor chord in these two Sections (see mm. 5 in Appendix A.2.1, and mm. 33 in Appendix A.2.5). These are examples of what Sawyer (1992) calls the "second level of ideation" that involves developing "the melodic phrase itself" (p. 258). The improvisers' uses of more specific ideas also resonate with Norgaard's (2008) notion of skilled improvisers using more "explicit ideas", which include "specific melodic figure[s]" or "melodic contour" (p. 70). These local idea-based representations also corroborate with Hargreaves' (2012a) notion of "audiation-generated ideas", where ideas are "unconsciously formulated" and where "the brain mentally "hears"…[the idea] without the sound being present" (p. 7).

Inspiration-based goals (inside of performance)

On one known occasion, Ron used an inspirational goal-based mental representation to establish his confidence during the improvisation. In particular, it enabled him to feel in control of the process and to explore ideas without inhibition. Additionally, this inspiration-based mental representation involved Ron's construction of a corporeal meaning.

Ron's inspirational goal-based representation, which was used at the end of the introductory recitative during the fourth motive (see mm. 7 to 8 in Appendix A.2.1), involved corporeal-based thoughts of being able to "make it my own" and to "do whatever I wanted" (see Section 5.4.2). In particular, Ron's inspirational-based goal was formed from "playing the [four notes] in a certain way" moments earlier (see Section 5.4.2), and from recognising these four notes as a theme from "Shenandoah" (see Section 5.4.3). As such, this inspirational goal had a global influence, as it appeared to motivate Ron throughout the rest of his improvisation. Similarly, a jazz improviser in Berliner's (1994) study also explained how the feeling of "proficien[cy]…[leads] you to a sense of freedom, and you get the inspiration to really…try out different things" (p. 202).

Communication-based goals (inside of performance)

Communicative goal-based mental representations played several global and local roles in the improvisers' interactions with the audience. In particular, the improvisers used them to convey general or specific musical and extra-musical expressions during their improvisations. Additionally, communication-based mental representations involved the improvisers' constructions of collaborative meanings.

At a global level, communicative goal-based representations provided the improvisers with a feeling or a story to convey an overall message in their improvisations. Stuart's communication-based representations involved collaborative goals of "trying to tell the person" and "trying to share that you…have feelings" based on a narrative about being involved in a romantic relationship (see Section 4.4.1). The use of a narrative is also seen in Bjerstedt's (2015) study, where jazz improvisers use "storytelling…to express his or her experiences in a truthful manner" (p. 504). As Sections 4.4 and 4.5.2 have shown, this narrative was woven into Stuart's entire improvisation. Meanwhile, Ron's communication-based representations involved collaborative goals of trying to convey "a journey of feelings

(see Section 5.4.2)" and where appropriate, to "use the energy of the crowd" (see Section 5.4.3). In particular, Ron's journey of feelings appears to be conveyed through the transformed reappearances of the original second and fourth motives throughout Ron's improvisation (see Appendix A.2).

At a local level, communicative goal-based representations were used convey particular expressions at a precise moment in the improvisation. In particular, Stuart used communication-based representations at three moments in his improvisation, which all involved collaborative goals. In variation two (see Appendix A.1.2), Stuart was focused on "communicat[ing] with the person" and "the audience" feelings of "tenderness" (see Section 4.4.3). Stuart then continued this "pattern of thought" (see Section 4.4.1) into variation three (see Appendix A.1.3), which developed into feelings of courage. Later, in variations five, six, and seven, Stuart was focused on "reiterat[ing] something…and expressing an emotion" (see Section 4.4.3). Lastly, in variations ten and eleven, Stuart was focused on "hav[ing] a contrast" between introducing new ideas and conveying emotions to "keep the communication interesting" (see Section 4.4.3), which was used together with a strategic representation (see earlier in this section). In particular, Stuart's description of using a "mixture of thinking" during this moment is supported by Berliner's (1994) observation of how jazz improvisers might "move mentally between musical and extramusical matters" (p. 176). To an extent, both improvisers' communicative representations resonate with Seddon's (2005) notion of a collaborative "non-verbal communication" (p. 54). Although Seddon studied a group improvisation context, the solo improvisers in this study also achieved "empathetic attunement" (p. 50), which Seddon compares to Berliner's (1994: 349) notion of "striking a groove", through their communication with the audience, where they "see things from other musical perspectives" (*ibid*., p. 50).

Summary

This section has looked at the roles that goal-based mental representations play for improvisers. Figure 6.2 presents a visual summary of the four types of goal-based mental representations that were identified inside (e.g. improvisation phase) and outside of performance (e.g. learning, ideation, reflection phases).

Figure 6.2: Four types of goal-based mental representations

As the figure shows, four types of goal-based mental representations were identified: strategic, idea, inspirational, and communicative. Strategic goal-based mental representations were involved in the preplanning of an improvisation, as well as specifying general approaches or specific strategies for improvising. Meanwhile, idea goal-based mental representations were involved in setting a general mood or musical style for the entire improvisation, and also provided particular musical ideas. Inspirational goal-based mental representations helped to override inhibitions and establish the improviser's confidence and sense of control. Finally, communicative goal-based mental representations were involved with the interactions between the improviser and the audience, which included the conveying of narratives and emotions.

6.2.2 Four types of production-based mental representations

The second category comprises four types of production-based mental representations. In particular, this subsection focuses on the roles of the following types of production-based mental representations: (1) progressive-recursive-based, (2) simulation-based, (3) instinctive-based, and (4) adaptive-based. These different types of mental representations have particular roles of production that function at a global or local level, as well as 'inside' and 'outside' of a performance. Global-level, production-based mental representations are defined, as productive intentions where a general implementation approach has been adopted, resulting in a long-term influence in the improvisation. Local-level, production-based mental representations are defined, as productive intentions where a more specific implementation

approach results in a short-term influence in the improvisation. Furthermore, production-based representations that are situated 'inside' of performance, resonate with Davidson and Scripp's (1992) notion of "production in performance", where the improvisers "demonstrat[e] how a set of actions can be executed, interpreted, or created" (p. 396). Meanwhile, production-based representations that are situated 'outside' of performance, resonate with the notion of "representation as production", where the improvisers "creat[e] a set of procedures or structur[e] interpretive knowledge through…descriptions of musical processes or…articulating theoretical or analytical models" (*ibid*., p. 396).

Progressive and recursive-based production (outside of performance)

Progressive and recursive productive-based mental representations played a key global role in the improvisers' memorisation of the given musical stimulus during the learning phase (e.g. outside of performance). In particular, these progressive and recursive production-based mental representations involved the improvisers' gradual constructions and development of representational, referential (intra-musical), causal, and corporeal meanings to help them memorise and reproduce the musical stimulus in different ways.

As Sections 4.2 and 5.2 show, both improvisers' progressive and recursive-based representations of the musical stimulus involved the formation of causal and corporeal associations. This is evidenced by their strong skills in aural-based reproduction and demonstrating a firm grasp of the musical structure by playing through the order of the motivic phrases in various tempos. Other studies have similarly reported improvisers' use of "cognitive strategies", where they "lear[n] the solo by ear…to create an aural image of separate phrases from the recording" (Nielson, 2015: 238; see also Johansen, 2017), or "metacognitive strategies" of "performing…parts of the solo in a slower tempo" (*ibid*; p. 242; see also Watson, 2015). In addition, Stuart formed a representational association to "a I-IV-V chord progression", as well as a referential (intra-musical) association to the song, "Answer me" from the pop genre (see Sections 4.2.3 and 4.2.6). Meanwhile, Ron formed representational associations to two keys (see Sections 5.2.1 and 5.2.2), as well as a referential (intra-musical) association to "Dvorak's New World symphony" (see Section 5.2.1). Similarly, in the study by Noice et al. (2008), an improviser learned new music by analysing chord progressions and forming associations to the colour "purple" and "horror music" (p. 69, 74). In terms of its global influences, the intra-musical associations from both improvisers'

progressive and recursive productive-based representations were also used in their formations of idea goal-based mental representations in the ideation phase (see Sections 4.3.1 and 5.3.1). These various learning approaches adopted by the improvisers reflect what Johansen (2017) calls an "intuitive versus intellectual/analytic thinking" (p. 57).

Simulation-based production (inside of performance)

Simulative production-based mental representations played global and local roles in the improvisers' implementation approaches during their improvisations. In particular, the improvisers used them to implement their ideas through role-play or imitation during flow establishment, scaffolding, and monitoring activities. Additionally, simulation-based representations involved the improvisers' constructions of referential (extra-musical) and corporeal meanings.

At a global level, simulation-based representations provided a general approach for the production of musical ideas. In particular, Stuart used simulation-based representations in a sustained act of role-play as a way to establish flow, where he "purposely made myself think of something that made me feel emotional". The musical influences of Stuart's referential (extra-musical) associations, which were formed by "literally thinking about something that is very upsetting in your life, and then put yourself in that place" (see Section 4.4.2), is seen in variations four to eight, where several new ideas are presented in D minor (see Section 4.5.2 and Appendix A.1.4 to A.1.8). This type of role-play during improvisation is akin to what Berliner (1994) calls a "constant spending…of a player's emotional reserves", where an improviser can sometimes "feel almost sick to my stomach because it is so heartrending and takes so much from me" (p. 203).

At a local level, simulation-based representations were used during scaffolding (see Sections 4.4.1 and 5.4.1) and monitoring activities (See Sections 4.4.3 and 5.4.3), and provided a specific approach for the production of musical ideas at a precise moment in the improvisations. In particular, the improvisers used them as fragments of emotional thoughts and dialogues during shorter acts of role-play, or in recalling a specific memory during the act of imitation. Stuart used simulation-based representations that involved referential (extra-musical) thoughts of "admit[ing] [feelings] together" that created variation two; "I can do this" that created variation three; "I'm trying to talk to you" that created variations five to seven; "I can fight this" that created variations ten and eleven; and thoughts of "it's time to stop

worrying", which created the coda (see Sections 4.4.1 and 4.4.3, and Appendix A.1). Stuart's simulation production shows an example similar to jazz improvisers' use of a "storytelling metaphor", from which one's "inner voice" and "inner vision" is expressed (Bjerstedt, 2015: 506).

On the other hand, Ron used simulation-based representations to recall and imitate memories of past performances. In particular, Ron's corporeal associations and imitation of the slow D-flat major chords from a summer festival performance (see Section 5.4.1) resulted in the slow opening of the introductory recitative (see Appendix A.2.1). Ron also formed corporeal associations by imitating the way "[he] was playing Shenandoah [with a high school group]" while improvising the first aria (see Section 5.4.3 and Appendix A.2.2). Likewise, Sudnow (2001), who mimicked another pianist, notes that "the very act of swaying gently with elongated movements, the…almost oozing quality of his interpretations could be at least vaguely evoked" (p. 75).

Instinctive-based production (inside of performance)

Instinctive production-based mental representations played a local role in the improvisers' implementation of their ideas during their improvisations. In particular, the improvisers used them as a direct means to execute music at the piano during scaffolding and monitoring activities, and while establishing flow. Additionally, instinctive-based representations involved the improvisers' constructions of causal and corporeal meanings. Such causal meanings are characterised by the improvisers' intuitive imagination and execution of sound metaphors that accompany extra-musical thoughts (Leman, 2010: 51-52). Meanwhile, corporeal meanings in this context are characterised by the improvisers' automatic or involuntary actions that often result in the production of unexpected or important musical ideas. These are identified from an awareness of their own attention, sense of control, mood, enjoyment, motivation, required skills, and experienced challenges, among other factors (Leman, 2010: 53-54).

Stuart used instinctive representations at four moments in his improvisation, often immediately after a simulation production-based representation. The surge of dynamic and chords in variation three came from Stuart's causal-based "impetus to do deep chord[s]" following his extra-musical thoughts of "I can do this!" (see Section 4.4.1 and Appendix A.1.3). In variations five to seven, Stuart's causal-based actions resulted in the tempo being "a

bit slower" following his extra-musical thoughts of "I'm trying to talk to you" (see Section 4.4.3 and Appendix A.1.5 to A.1.7). Next, Stuart's involuntary corporeal-based actions in variation eight resulted in a set of unexpected triplet motives (see Section 4.4.4 and Appendix A.1.8). Lastly, variations ten and eleven are a manifestation of Stuart's causal-based actions to have "more energy, more volume, more chords, and more thickness" to illustrate extra-musical thoughts of "regaining strength" and "I can fight this". This direct connection between Stuart's thoughts and his playing demonstrates a close link between Pressing's (1988) notions of "musical" and "movement" aspects (p. 154, 160). In particular, the former is a "cognitive representation of the sounds in terms of…expressive dimensions", while the latter is a representation of "timing of…actions… touch, spatial perception, and central monitoring of efference" (*ibid.*, p. 154). In addition, Stuart points out that his corporeal-based action to "vary the contrast" is a "trait of [his] style" (see Section 4.4.3 and Appendix A.1.10 to A.1.11). Most of Stuart's instinctive productions demonstrate what Hargreaves (2012a) calls "strategy-generated ideas with a motor directive" as Stuart "employ[s] a conscious engagement of a motor strategy" (p. 9) to play "slower", "deep chords", or with "more volume" and "more energy".

Meanwhile Ron used instinctive representations in at least three moments in his improvisation. The appearances of the minor iv chords in mm. 5 and 33 to 34 was a result of Ron's causal-based actions after hearing the chord "in [his] head and…just went with it" (see Section 5.4.1 and Appendix A.2.1 and A.2.5). In addition, Ron's recognition of the Shenandoah theme in the introductory recitative came from his corporeal-based actions of "playing the notes a certain way" (see Section 5.4.2 and Appendix A.2.1). Ron's instinctive production approach demonstrates "a strong link between…knowledge of sound and sound sources", so that "images of sound may trigger images of sound production" and vice versa (Godoy, 2001: 238).

Adaptive-based production (inside and outside of performance)

Adaptive production-based mental representations played a local role within and outside of Stuart's improvisation. In particular, Stuart used them to accommodate changes in his production approach during the ideation phase, and also later on while monitoring the audience. Additionally, adaptive-based representations involved Stuart's constructions of causal and corporeal meanings.

In the ideation phase, Stuart used an adaptive-based representation to modulate the musical stimulus from D-flat major into F major. In particular, it involved forming causal associations to the sound of F major, as well as corporeal associations of reproducing the musical stimulus in the new key (see Section 4.3.2). During variations ten and eleven in his improvisation, Stuart's adaptive-based representation involved forming corporeal associations to "a mixture of thinking" that enabled him to combine and simultaneously execute both corporeal and causal-based actions for different types of emotional and contrast-driven musical ideas (see Section 4.4.3 and Appendix A.1.10 and A.1.11). Stuart's adaptive production approach is similar to how other improvisers obtain "technical flexibility" by practicing "from different scale degrees", "transcending motor patterns" in order to develop "a fast mindset" (Johansen, 2017: 57-58).

Summary

This section has looked at the roles that production-based mental representations play for improvisers. Figure 6.3 presents a visual summary of the four types of production-based mental representations that were identified inside (e.g. improvisation phase) and outside of performance (e.g. learning, ideation, reflection phases).

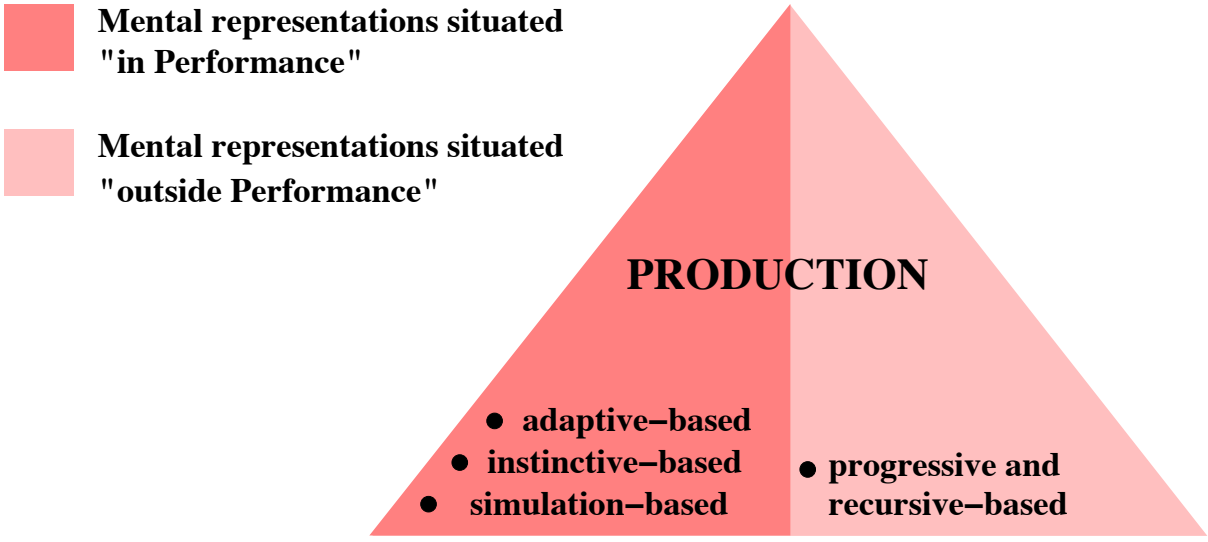

Figure 6.3: Four types of production-based mental representations

As the figure shows, four types were identified: progressive/recursive, simulation, instinctive, and adaptive. The progressive and recursive type played key role in improvisers' memorisation of the musical stimulus. The simulative-type deals with implementation approaches during improvisation through the use of role-play and imitation. The last two

types played a local role for both improvisers. The instinctive type provided a direct means to execute music at the piano. The adaptive type accommodates changes in production approaches.

6.2.3 Four types of reflection-based mental representations

The third and final category comprises four types of reflection-based mental representations. In particular, this subsection focuses on the roles of the following types of reflection-based mental representations: (1) progressive-based, (2) self-based, (3) social-based, and (4) performance-based. These different types of mental representations have particular feedback roles that function at a global or a local level, as well as 'inside' and 'outside' of a performance. Global-level, reflection-based mental representations are identified as a type of reflective awareness that involves general observations of the improvising experience or judgements of the improvisation itself. Local-level, reflection-based mental representations are identified as a type of reflective awareness that involves specific observations or judgements of a particular moment in the improvisation. Furthermore, reflection-based representations that are situated 'inside' of performance resonate with Davidson and Scripp's (1992) notion of "perception in performance", where the improvisers are "monitoring a set of actions" (p. 396). Meanwhile, reflection-based representations that are situated 'outside' of performance, resonate with the notion of "representation as perception", where the improvisers "recogni[se] or discriminat[e]…musical elements, dimensions, or forms" (*ibid*., p. 396).

Progressive-based reflections (outside of performance)

Progressive reflection-based mental representations played a global role in how the improvisers' made sense of their learning and improvising experiences during the reflection phase (e.g. outside of performance). In particular, the improvisers used them to understand their improvisations as a whole "product" (Berliner, 1994: 221), as well as its relationship to the musical stimulus. It is a type of "reflection" that, as Davidson and Scripp (1992) puts it, "acknowledges the essential role of reenvisioning [and] reconceptualising...an interpretative performance" (p. 396). Additionally, progressive reflection-based representations involved the improvisers' layered constructions of referential (intra and extra-musical), causal, corporeal, and representational meanings.

In particular, the improvisers' progressive reflection-based representations are captured through their drawings of the musical stimulus and their improvisations. Through their illustrations, both improvisers demonstrated "recognition or discrimination of musical elements, dimensions, or forms outside of performance" (*ibid.*). Both Stuart and Ron's drawings show representational and referential (intra-musical) meanings through associations between structural components, causal meanings through associations to different musical textures, and corporeal meanings through associations to changes in pitch, chronological events, and the keyboard topography (see Sections 4.5 and 5.5). Like Lisboa (2003), who examined children's conceptualisation of music through their drawings, the improvisers' illustrations show a "complex mixture of explicit knowledge articulated through language, and implicit understanding conveyed through playing" (p. 293). As such, the improvisers' progressive reflection-based representations have a global role in terms of representing a multi-dimensional view of the improvisers' performances and their experiences, allowing them to understand the musical stimulus and their improvisation as parts of a complete process.

Self-based reflections (inside of performance)

The improvisers used self-based mental representations to monitor their sense of control while performing, by noting both expected and unexpected moments in their improvisations. In particular, it involved the improvisers' awareness of their moods, feelings, and other reactions to their experiences, which sometimes affected their actions later on in the performance. These self-based reflections resonate with Norgaard's (2008) notion of the "evaluative monitoring process", where improvisers "evaluat[e] their own playing", including being "happy with" or "surprised" by what they have performed (p. 65-67). Furthermore, self-based representations involved the improvisers' constructions of corporeal meanings, and functioned at both a global and a local level during flow establishment and monitoring activities.

At a global level, self-based representations enabled improvisers to monitor individual tendencies, and to note significant moments in their improvisations. In particular, Stuart's self-based representation involved his corporeal-based awareness of noting how he is "used to…[having] moti[ves] stuck in my head" when he improvises (see Section 4.4.4). Meanwhile, Ron's self-based representations involved a corporeal-based awareness about the first aria

being "a fun spot" where he "no longer cared", allowing him to let go for the rest of his improvisation (see Section 5.4.2 and Appendix A.2.2). Furthermore, Ron also used self-based representations throughout his improvisation to monitor his tendency to self-criticise, and to make sure that he is "let[ing] go of an inner critic" (see Section 5.4.2). Classical pianist Robert Levin also experiences a similar tendency to self-criticise during improvisation: "Sometimes the mind is saying, "This isn't going very well," or the mind is saying, "Don't go in that direction…" (Berkowitz, 2009: 170).

At a local level, self-based representations enabled improvisers to note their own reactions and form specific judgements to a particular moment in the improvisation. Stuart's self-based representation in variation eight involved a corporeal-based feeling of surprise as he "wasn't expecting" the triplets, which he referred to as the "bit [that] went a bit flippant (see Section 4.4.4. and mm. 47 to 52 in Appendix A.1.8). Many other improvisers have also encountered similar unexpected events (Després et al., 2017: 15), as one from Berliner's (1994) study noted: "I'll surprise myself and play things I'm not expecting to play" (p. 208). Sometimes, self-based representations may be intrusive, which can lead to a disruption in the improvisation, as Stuart notes: "as soon as I thought: "oh, what shall I do next?" that's when it completely goes [apart]" (see Section 4.4.2). For Robert Levin, however, such questions may sometimes help with idea generation: "I get to a big fermata, I think, "What am I going to do now? Oh, I'll do that"[136] (Berkowitz, 2009: 169). On the other hand, Section 5.4.2 shows how Ron's self-based representation helped him to identify his reaction to the music in the introductory recitative ("I started feeling something"), and the referential (extra-musical) association he had formed ("a deep feeling, like love") (see Appendix A.2.1).

Social-based reflections (inside of performance)

Social reflection-based mental representations played a global and a local role in the improvisers' awareness of the audience during their improvisations. This form of awareness relates to what Bjerstedt (2015) calls a "collective interplay", where "the improviser must relate outwards continuously…to the audience" (p. 508). In particular, the improvisers used them during flow establishment and monitoring activities. Additionally, social-based representations involved the improvisers' constructions of collaborative meanings.

[136] At the same time, Robert Levin also notes: "So there's a bit of that [questioning], but not the sense of doing it every two bars. There's no time for that." (Berkowitz, 2009: 169).

At a global level, improvisers used social-based representations to monitor their own reactions to the audience, and to judge the appropriateness of the improvisation. In particular, Ron's social-based representations involved a collaborative-based awareness of feeling generally apprehensive about the audience towards the beginning (see Section 5.4.2), a feeling commonly reported by other improvisers (see Berliner, 1994: 48), and monitoring the musical direction throughout the improvisation (see Section 5.4.3).

At a local level, improvisers used social-based representations to monitor and judge the audience's attention and interest at specific points in the improvisation, and to make necessary adjustments accordingly. In variation nine, for instance, Stuart's social-based representation involved a collaborative-based awareness where he felt he "was losing the audience", which prompted him to introduce musical contrasts into variations ten and eleven (see Section 4.4.3 and Appendix A.1.9). Stuart's social-based representations are similar to how jazz improvisers strive for "an appropriate balance between repetition and variation", noting that "as soon as you [repeat a melody] a third time, [the audience] is asleep if you don't finish it differently (Berliner, 1994: 196). By introducing a musical contrast, Stuart also shows "the ability to anticipate the audience reception of an anticipated musical segment and shape their improvisation according to this projection" (Després et al., 2017: 14-15).

Performance-based reflections (inside of performance)

Performance reflection-based mental representations played a variety of global and local roles during the improvisers' performances. The findings offered evidence for two different types of performance-based representations that enabled the improvisers to focus on various aspects of their improvisations. In particular, these different mental representations directed the improvisers' attentions towards (1) musical possibilities, and (2) the structure or narrative of the performance. These two types of performance-based representations, then, are presented in the following subsections.

Imagining musical possibilities

The first type of performance-based representation was used by Ron to monitor his improvisation for musical possibilities. In particular, it enabled Ron to be open to potential ideas that might surface during the improvisation and to find different ways of developing it. Furthermore, these possibility representations involved Ron's constructions of corporeal and

referential (intra-musical) meanings. Ron's corporeal-based awareness of the improvisation "ha[ving] a force of its own", led him to "pla[y] with the energies" of the music, which resulted in the tempo fluctuations and waves of crescendos throughout both arias and the reprise (see Section 5.4.3 and Appendix A.2.2 to A.2.4). Ron's possibility representations corroborate with jazz improviser Art Farmer's "spectator" experience, where his improvisations "seem to have a life of its own…developing by itself" (Berliner, 1994: 218). In addition, the development of the fourth motive throughout the same Sections came from Ron's referential (intra-musical) association to another song, where he recognised the four notes as "Shenandoah" (see Section 5.4.3 and Appendix A.2.2). Ron's development of the fourth motive is an example of what Norgaard (2008) calls the "melodic priority strategy" (p. 184). Thus, Ron's imagination of musical possibilities resulted in global influences as evidenced in the development of familiar themes, and constant changes in the tempo and the dynamics throughout his improvisation.

Surveying the narrative or structure

The second type of performance-based representation played a role in the improvisers' survey of the unfolding structure or narrative in their improvisation. In particular, it enabled the improvisers to locate particular landmarks in their performances, and to holistically conceptualise their improvisations. Furthermore, these survey representations involved the improvisers' constructions of referential (extra and intra-musical) meanings, and functioned at both a global and a local level during scaffolding and monitoring activities.

At a global level, survey representations involved the improvisers' conceptualisation and understanding of the entire or large Sections of their improvisations. Stuart's survey representations involved an extra-musical understanding of his entire improvisation as a narrative about "a romantic relationship" (see Section 4.4.1). In addition, Stuart referred to variations four to eight as "another level of depth", evidencing a referential (intra-musical) understanding of a large Section in his improvisation's structure (see Section 4.4.3 and Appendix A.1.4 to A.1.8). Meanwhile, Ron's survey representation involved a referential (intra-musical) conceptualisation of his whole improvisation's structure as a "free association" between a four-note motive from "Shenandoah" and "other melodies" (see Section 5.4.3 and Appendix A.2). Stuart and Ron's global survey representations are an example of what

Després et al. (2017) calls a "macro-structural" or a "formal construction of the improvisation" (p. 14).

At a local level, survey representations involved an improviser's situated understanding of a specific moment in his improvisation. In particular, Stuart was able to recall and demonstrate the precise location of where the unexpected triplet motive had appeared "in the middle" of his improvisation. In doing so, Stuart shows a referential (intra-musical) understanding of the microstructure in variation eight (see Section 4.4.4 and mm. 47 to 52 in Appendix A.1.8). Stuart's local survey representation is an example of a "micro-structural" or a construction of "phrasing and articulations" (Després et al., 2017: 14). Both improvisers also demonstrate the process of "long-term recall", where they "are able to recall the entire improvisation from its genesis" (Kenny and Gellrich, 2002: 124).

Summary

This section has looked at the roles that reflection-based mental representations play for improvisers. These are mostly concerned with feedback that involves general observations of the improvising experience or judgements of the improvisation itself, specific observations or judgements of a particular moment in the improvisation. Figure 6.4 presents a visual summary of the four types of reflection-based representations that were identified inside (e.g. improvisation phase) and outside of performance (e.g. learning, ideation, reflection phases).

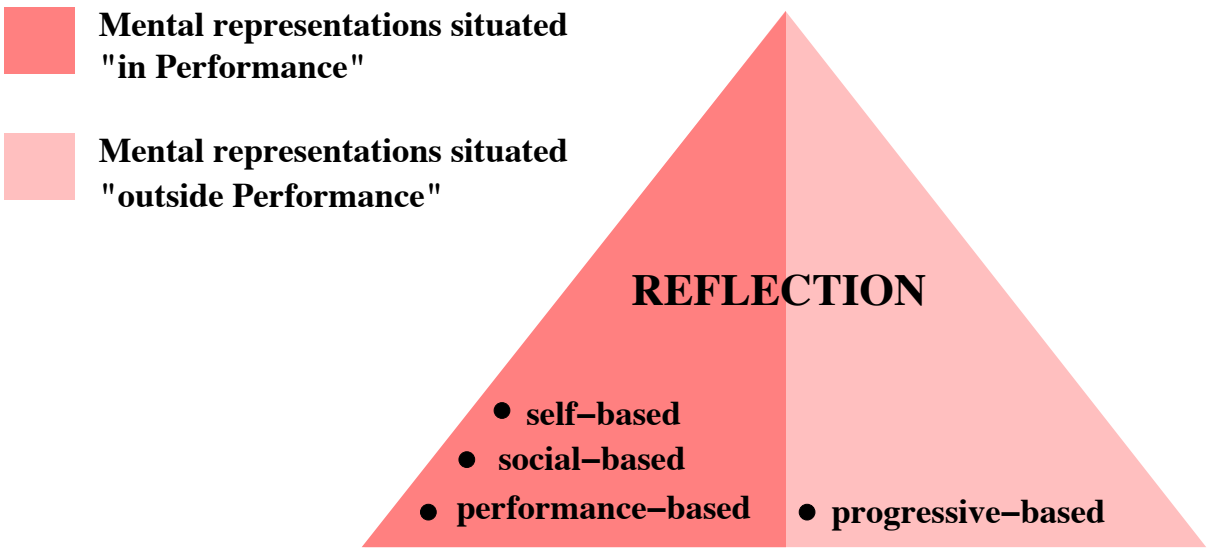

Figure 6.4: Four types of reflection-based mental representations

As the figure shows, four types were identified: progressive, self, social and performance. The progressive type enabled improvisers to make sense of their learning experience and improvisation as a whole "product", as evidenced through their drawings. The self-type monitors the sense of control in performance noting both expected and unexpected moments, awareness of moods, feelings and other reactions to experiences. The social-type deals with the awareness of the audience during improvisation, in particular during flow establishment and monitoring activities. The performance-type includes two mental representations that enable the improvisers to direct their attentions towards musical possibilities and the structure or narrative of the performance.

6.2.4 Summary

Bringing this section to a close, figure 6.5 presents a visual summary of the different types of goal, production, and reflection-based mental representations that were discussed in Sections 6.3.1, 6.3.2, and 6.3.3.

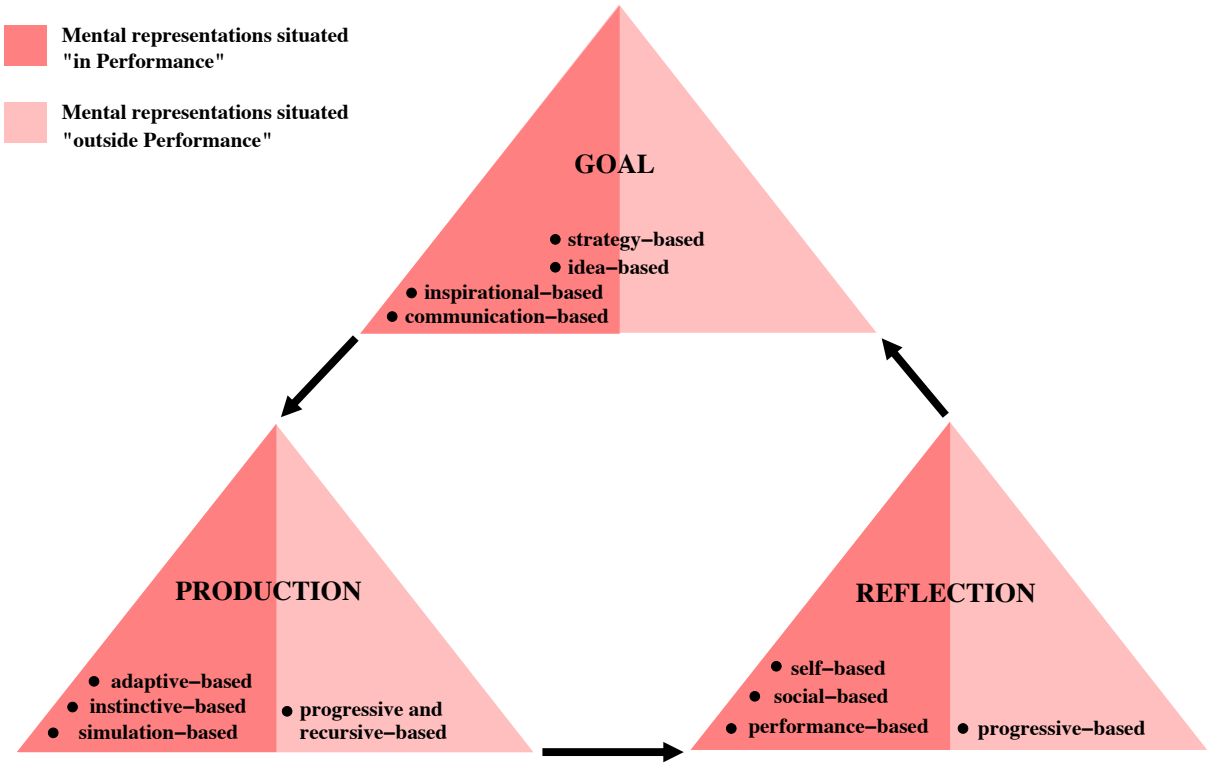

Figure 6.5: Twelve types of goal, production, reflection-based mental representations

Figure 6.5 shows four types of goal-based representations, four types of production-based representations, and four types of reflection-based representations that were identified across two contexts from the improvisers' learning, ideation, improvisation, and reflection phases[137]. The first context shows the mental representations that were present during the phases of learning, ideation, and reflection, which took place "outside" the improvisers' performances. Meanwhile, the second context shows the mental representations that were present during the improvisation phase, which took place "inside" the improvisers' performances. Between the two contexts, the figure shows a much larger number of different mental representations appearing within the context of performance. This reflects the improvisers' distributed focus across various aspects of planning, producing, and monitoring their improvisations. On the

[137] The interactions between the improvisers' mental representations, as indicated by the arrows, are drawn from the findings in Sections 4.4. and 5.4 (see figures 4.19 and 5.15).

other hand, the production and reflection progressive-based representations that appear outside of performance contexts show the improvisers' concentrated focus on reproducing the musical stimulus (e.g. learning phase) and conceptualising their performance (e.g. reflection phase). Lastly, strategy and idea goal-based mental representations appear to straddle both contexts. Their presence in both contexts illustrates the improvisers' preplanning activities that took place before their improvisations.

6.3 Understanding the nature of mental representations

Building on the discussion of the key findings, the final part of this chapter presents the key features of the improviser' perceived mental representations. Here, the essential components of the various formations and roles of mental representations are brought together from earlier chapters and Sections, and rearranged into an understanding of their nature. This section, then, is split into three parts. The first subsection draws from chapters 4 and 5, and Sections 6.2 and 6.3 to present three key features of the improvisers' perceived mental representations across the dimensions of meaning construction, the formation of their mental representations and meanings, and their roles. The second subsection extends Lehmann's (1997) model by introducing a tripartite of the two improvisers' mental representations during performance, thus synthesising the key feature of their multiple roles. Finally, this section closes with the third subsection, where a model summarising the nature, formation, and role of the improvisers' mental representations is presented and formalised. In particular, the model shows a synthesis and distillation of all the three key features of the improvisers' mental representations during and beyond performance.

6.3.1 Key features of two professional improvisers' mental representations

This subsection introduces three key features of the improvisers' mental representations. Each feature comprises the essential components that describe the phenomenon of the two improvisers' mental representations, which can be understood across three dimensions. These dimensions consist of the (1) improvisers' constructions of multiple meanings, (1) the multiple ways their mental representations and meanings are formed, and (3) the multiple roles their mental representations take on. In addition, the discussion of each feature revolves around the musical stimulus, which played a key role in the types of mental representations

that the improvisers formed and the meanings they constructed. These features, then, are presented in the following three parts.

Multiple meanings

The first key feature of mental representations is characterised by the improvisers' constructions of six meanings. These six meanings comprise: representational, referential (intra and extra-musical), causal, corporeal, and collaborative meanings (Leman, 2010). In particular, the musical stimulus is the driving force behind these different types of meaning constructions. Furthermore, the number and the types of meanings that are constructed are dependent on four different contexts in which the musical stimulus is understood by the improvisers. These contexts include: the learning phase, the ideation phase, the improvisation phase, and the reflection phase.

In the learning phase, the improvisers memorised the musical stimulus through the use of multiple meanings, including referential (intra-musical), representational, causal, and corporeal meanings[138]. In the ideation phase, the improvisers particularly retained the intra-musical associations of the musical stimulus created from the learning phase, and enriched it with extra-musical, corporeal, and collaborative meanings[139]. In Stuart's case, the intra-musical association to "Answer Me" was enriched with his extra-musical associations of pleasant feelings[140]. In Ron's case, the intra-musical association to Dvorak's New World Symphony was enriched with associations of a field with white flowers, as well as corporeal associations of how to be stylistically different[141]. The improvisers' meaning enrichment of their ideas is supported by Berliner (1994), who notes that jazz improvisers "draw upon the extra-musical associations of the compositions that serve as vehicles" (p. 203).

During the improvisation phase, the improvisers' performances were primarily driven by the meanings of the musical stimulus that they had created from the ideation phase, as well by new meanings that emerged during their improvisation. In Stuart's case, the extra-musical association of the musical stimulus had developed into a narrative of a romantic relationship upon which his improvisation is based[142]. In Ron's case, the corporeal association of how to

[138] See learning phases in Sections 4.2, 5.2, 6.2.1, 6.2.2, 6.2.3, and 6.2.4, as well as figures 4.2 and 5.2.
[139] See ideation phases in Sections 4.3.1, 5.3.1, 6.2.1, and 6.2.3, as well as figures 4.3 and 5.3.
[140] See Section 4.3.1 and figure 4.3.
[141] See Section 5.3.1 and figure 5.3.
[142] See Section 4.4.1 and figure 4.4

be different from the musical stimulus had developed into an improvisation based on free association, and created new intra-musical associations to the song "Shenandoah" that became the new driving force in his performance[143].

Lastly, in the reflection phase, the improvisers' primary meanings of the musical stimulus that drove their improvisations is re-understood in terms of how their primary meanings of the musical stimulus have evolved, from the ideation to the performance phases. In particular, Stuart's drawings showed an evolution of meaning representation from abstract shapes to extra-musical depictions of various emotions associated with a romantic relationship[144]. Meanwhile, Ron's drawings showed an evolution of intra-musical meaning representation from a sequential grouping of abstract shapes to a more structured grouping of similar abstract shapes[145]. The improvisers' drawings are an example of what Davidson and Scripp (1992) call a "declarative representation", which shows a type of "knowledge-beyond-performance" through music notation or writing (and drawing) (p. 396).

Multiple formations

The second key feature of the improvisers' mental representations is characterised by two interlinked processes. These comprise the processes of mental representation formation, and the processes of meaning construction. Both processes are driven by the musical stimulus, which determines the formation of necessary meanings and mental representations to learn new music and to produce an improvisation. In particular, mental representations are formed from the improvisers' intentions[146], which are driven by the different learning, ideation, improvisation, and reflection phases. Meanwhile, the meaning construction processes occur in two modes. The first mode deals with the construction of a new meaning through the improvisers' combination and organisation of associations from their experiences[147]. The second mode involves the improvisers' modifications of a previously constructed meaning through the processes of revision, development, and expansion[148].

[143] See Sections 5.4.2, 5.4.3 and figures 5.6 and 5.9.
[144] See Section 4.5 and figures 4.17 and 4.19.
[145] See Section 5.5 and figures 5.13 and 5.15.
[146] See Section 6.2.
[147] See Section 6.2.1.
[148] See Sections 6.2.2, 6.2.3, and 6.2.4.

The improvisers' learning phase comprised the formation of progressive-based mental representations, which involved all of the meaning construction processes[149]. This suggests that improvisers formed complex mental representations while learning the musical stimulus, which resonate with the learning approaches of the jazz improviser in the study by Noice et al. (2008). During the improvisers' ideation phase, goal and production-based representations were formed, which involved only the processes of meaning construction and revision[150]. This suggests that improvisers pre-plan and may make minor adjustments to their understanding of the music stimulus before improvising, which corresponds to similar reports of classical music improvisers using preplanning strategies prior to improvisation (Després et al., 2017). In the improvisation phase, the improvisers formed a variety of goal, production, and reflection-based mental representations, which involved all four processes of meaning construction[151]. This reflects the improvisers' multiple ways of interpreting and understanding the musical stimulus during performance, lending support to Davidson and Scripp's (1992) framework proposing musicians' "different ways of knowing" (p. 395). Finally, during the reflection phase, the improvisers formed progressive reflection-based mental representations, which involved the processes of meaning construction, development, and expansion[152]. This implies that the improvisers have focused on the major events in the musical stimulus and their improvisations.

Multiple types of roles

The third key feature of the improvisers' mental representations is characterised by twelve different types of roles they play in the improvisers' learning, ideation, improvisation, and reflection phases. In particular, these twelve roles comprise four types of goal-based mental representations, four types of production-based mental representations, and four types of reflection-based mental representations[153]. The precise selection of roles at different stages is driven by the musical stimulus and the improvisers' knowledge and experiences, as well as the improvisation.

[149] See learning phases in Sections 4.2, 5.2, 6.2.1, 6.2.2, 6.2.3, and 6.2.4, as well as figures 4.2 and 5.2.
[150] See ideation phases in Sections 4.3.1, 5.3.1, 6.2.1, and 6.2.3, as well as figures 4.3 and 5.3.
[151] See improvisation phases in Sections 4.4, 5.4, 6.2.1, 6.2.2, 6.2.3, and 6.2.4, as well as figures 4.15 and 5.11.
[152] See reflection phases in Sections 4.5, 5.5, 6.2.1, 6.2.2, and 6.2.4, as well as figures 4.20, 4.21, 5.16, and 5.17.
[153] See Sections 6.3.1, 6.3.2, and 6.3.3.

In the learning phase, both improvisers used only progressive and recursive production-based mental representations to memorise the musical stimulus in multiple ways[154]. In the ideation phase, both improvisers used idea goal-based mental representations[155]. However, Stuart also used an adaptive production-based representation to modulate the musical stimulus into an easier key[156], while Ron used a strategic goal-based representation to set performance constraints for playing solo, and to be stylistically different from the musical stimulus[157].

In the improvisation phase, the improvisers used a variety of goal, production, and reflection-based mental representations to accommodate their different treatments of the musical stimulus in their improvisations. In particular, both improvisers used strategic and communication-based goals, simulation and instinctive production, and self, social, and structural based reflections during their performances[158]. In addition, the improvisers' different treatments of the musical stimulus resulted in two different improvisations where one was hierarchically structured and another was associatively structured[159]. These two performance structures resulted in the uses of different types of mental representations with particular interactions between them.

Finally, in the reflection phase, both improvisers used only progressive reflection-based mental representations to conceptualise their multiple understandings of their improvisations and of the musical stimulus.

6.3.2 Extending's Lehmann (1997) model to improvisers

This subsection presents a model that extends Lehmann's (1997) tripartite of mental representations to include improvisers in the context of thematic musical improvisation. Drawing on the findings[160] and the discussion[161] chapters, it was found that the improvisers' different types of goal, production, and reflection-based mental representations and the

[154] See progressive and recursive based representation in Section 6.3.2.
[155] See idea-based representation in Section 6.3.1.
[156] See adaptive-based representation in Section 6.3.2.
[157] See strategy-based representation in Section 6.3.1.
[158] See Sections 4.4, 5.4, 6.3, as well as figures 4.15 and 5.11.
[159] See Appendix A.1 and A.2.
[160] See figures 4.19 and 5.15.
[161] See Sections 6.2 and 6.3.

interactions between them are similar to both of the examples of expert sight-readers and the expert soloists from Lehmann's (1997) model[162].

First, the improvisers' goal-based mental representations (see Section 6.3.1) resemble the both expert sight-reader and the expert soloist's desired performance goals in terms of having an "approximate" "interpretation" and development of the musical stimulus. This is evidenced by the improvisers' formations of idea and strategic goal-based mental representations from the ideation phase (Sections 4.2.2 and 5.2.2), where in the context of thematic musical improvisation, an "overall shape of the piece" is "to some extent worked out in advance" (Clarke, 1988: 8).

Second, the improvisers' production-based mental representations (see Section 6.3.2) resemble the expert sight-reader's representation of production aspects, where "inferred" musical expressions are "translated into motor programs" for the piano. This is evidenced by the improvisers' uses of instinctive, simulated, and adaptive production-based mental representations[163], a finding supported by Pressing's (1988) notions of acoustic, musical, movement, and emotional aspects.

Third, the improvisers' reflection-based mental representations (see Section 6.3.3) resemble the expert soloist's representation of the actual performance in terms of "monitoring [the] interpretation [of the musical stimulus] as it sounds in performance environment" (*ibid*., p. 142). This is evidenced by the improvisers' uses of different reflection-based mental representations to monitor the musical structure, the extra-musical narrative, and developmental possibilities, among other aspects of their improvisations[164], a finding supported by expert-level improvisers' different evaluative monitoring processes in Norgaard's (2008) study. The following figure, then, presents an adaptation of Lehmann's (1997) model[165] to show proposed tripartite mental representations of the two professional improvisers in this study.

[162] See Section 2.1.3.
[163] See Sections 4.4 and 5.4.
[164] See Sections 4.5.1, 4.5.3, 4.5.4, and 5.4.3.
[165] Lehmann's (1997) model was first presented in Section 2.1.3.

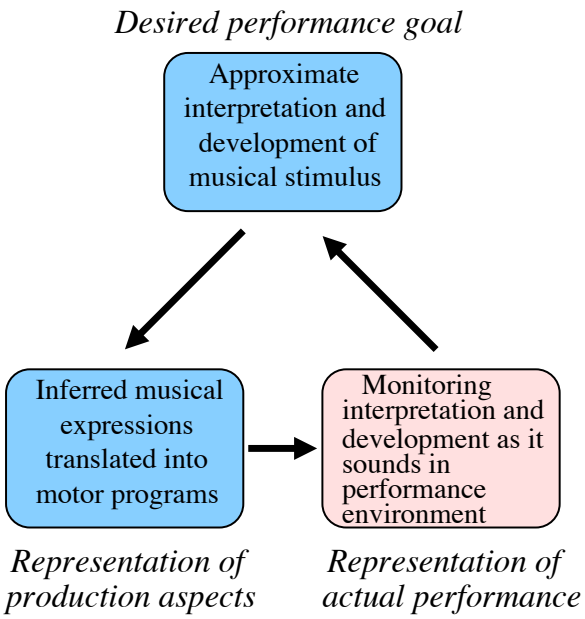

Figure 6.6. Tripartite of Two Professional Improvisers' Mental Representations

As the figure shows, the interactions between the improvisers' goal and production-based mental representations matched Lehmann's example for expert soloists[166]. The lack of forward-back interaction between the two mental representations may refer to the implementation of goal-directed actions where "larger improvisational errors…such as striking an unintended key on the piano…are so noticeable…that correction is impossible" (Pressing, 1984: 354).

Furthermore, the interactions between the improvisers' reflection and goal-based mental representations matched Lehmann's example for expert sight-readers[167]. Once again, this linear interaction may reflect the fact that in improvisation, "the goals of the music making are exploration and process, rather than the presentation of artistic product" (p. 150), which means that the improviser does not make instant adjustments to the performance based on rehearsed music. Lastly, the interactions between the improvisers' production and reflection-based mental representations matched Lehmann's examples for both expert soloists and sight-readers[168], which supports the fact that feedback is "gathered from that which can be previously recalled [or produced]" (Kenny and Gellrich, 2002: 137).

[166] See evidence in Sections 4.4.1, 4.4.2, 4.4.3, 4.4.4, 5.4.1, 5.4.3, and figures 4.15 and 5.11.
[167] See evidence in Sections 4.4.1, 4.4.3, 4.4.4, 5.4.2, and 5.4.3, and figures 4.15 and 5.11.
[168] See evidence in Sections 4.4.4, 5.4.2, and 5.4.3, and figures 4.15 and 5.11.

6.3.3 Preliminary model: nature, formation, and role of mental representations

Bringing together the discussion from subsections 6.4.1 and 6.4.2, the final subsection in this chapter presents a preliminary model that illustrates the nature, formation, and role of the improvisers' mental representations. In the following page, the model in figure 6.6 summarises the three key features of the two improvisers' mental representations. In particular, this model draws from the findings and the discussions, which were interpreted through an analytic framework informed by Lehmann's (1997) model and Leman's (2010) framework of embodied semantics.

In this model, the key feature describing the improvisers' constructions of multiple meanings is shown in the blue and yellow triangles, where six types of constructed meanings are formed through three ways of meaning connections (see Section 6.2). Next, the key feature describing the multiple formations of the improvisers' mental representations and their meanings is shown by two sets of arrows between the blue and the red triangles. In particular, the first set of blue arrows surrounding the blue triangle shows the meaning formation processes of construction, development, revision, and expansion. The second set of black arrows between the red and the blue triangles shows the symbiotic interactions between the processes of the improvisers meaning constructions and the formation of their mental representations, illustrating how the formation of one informs the construction of the other.

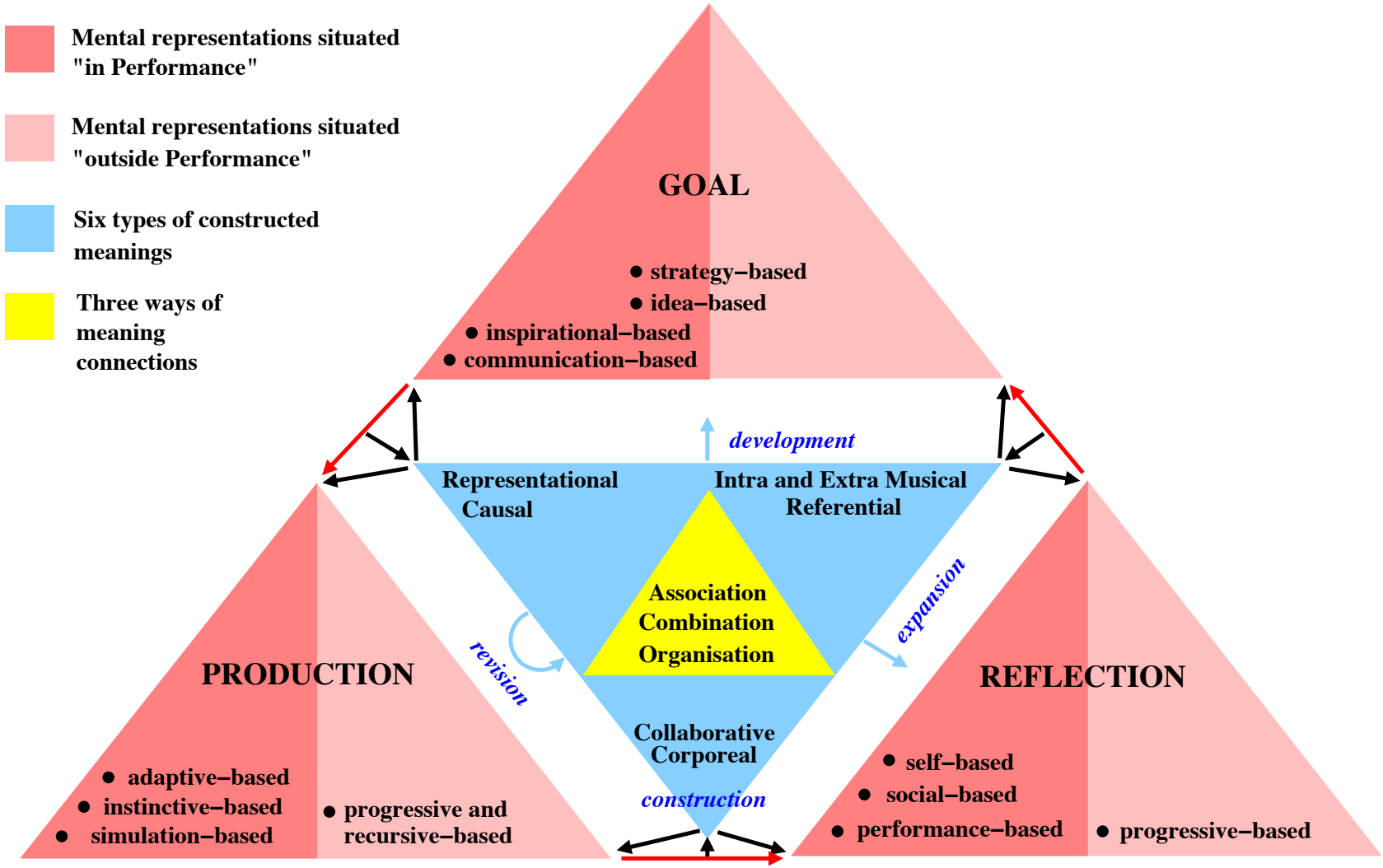

Figure 6.7: Preliminary model – nature, formation, and role of mental representations

Lastly, the key feature describing the multiple roles of the improvisers' mental representations is illustrated by the red triangles. Each of the red triangles features a kind of mental representation – goal-based, production-based, and reflection-based (see Section 6.3). In particular, the "goal" triangle shows four different types of goal-based representations: strategy-based, idea-based, inspiration-based, and communication-based (see Section 6.3.1). Meanwhile, the "production" triangle shows four different types of production-based representations: progressive and recursive-based, simulation-based, instinctive-based, and adaptive-based (see Section 6.3.2). Lastly, the "reflection" triangle shows four types of reflection-based representations: progressive-based, self-based, social-based, and performance-based (see Section 6.3.3). In addition, each of the red triangles is split into two parts, showing which types of mental representations are situated "inside of performance", "outside of performance", or are found in both contexts. Furthermore, the red arrows between these red triangles show the interactions between the improvisers' different types of goal-based, production-based, and reflection-based representations during performance, drawing from the analysis as summarised in figures 4.19, 5.15, and 6.5.

The multiple components and their interactions illustrated in this model reflects Bjerstedt's (2015) notion of the "multivariety of aspects" in the learning and performing processes of improvisers (p. 507). In particular, the interactions between the multiple types of mental representations and the different processes of meaning construction illustrate the improvisers' "multi-directedness", in the sense that "the improviser's attention is always (1) *directed*, never contained; (2) directed in *multi*-varied ways, never only in one way" (*ibid.*, original italics). Furthermore, the different types of self and social reflection-based mental representations illustrate Bjerstedt's notions of "*self-directedness* (inner voice, inner vision)" and "*context-directedness* (fellow musicians, audience)". Meanwhile, the different types of simulation-based production and idea-based goal representations illustrate the notion of "*text-directedness* (tradition, style, formulae, quotes)". Lastly, the different types of strategy-based goal and performance-based reflection representations illustrate the notion of "*goal-directedness* (planning, structure)" (*ibid.*, p. 508, original italics).

6.4 Chapter summary

In closing, this discussion chapter has presented and discussed the key findings from chapters four and five in relation to the existing literature. Section 6.2 discussed the findings that were related to the formation of the improvisers' mental representations. In particular, the interlinked relationships between the improvisers' mental representation formation and four processes of meaning constructions were introduced and expounded across the learning, ideation, improvisation, and reflection phases. Section 6.3 discussed the findings that were related to the roles of the improvisers' mental representations. In particular, twelve different types of goal, production, and reflection-based mental representations were presented across two contexts in terms of their roles 'inside' and 'outside' of a performance. Finally, Section 6.4 brought the previous two Sections together to discuss the nature of the improvisers' mental representations. In particular, three key features were introduced and expounded, leading to the presentation of two models. The first model extends Lehmann's (1997) tripartite mental representations of expert soloists and sight-readers to include expert improvisers. Lastly, the second model distils the three key features to show the nature, formation, and roles of the improvisers' mental representations.

Chapter 7: Conclusions and implications

Chapter 7 presents the conclusions that have been developed from the discussion of the key findings in chapter 6, and moves to discuss the implications, limitations, and contributions of this study.

To remind the reader, the present study investigated two professional pianists' perceived mental representations in the context of a thematic musical improvisation. The topic of this study was inspired and builds on the theoretical work of Pressing (1988), Pike (1974), and Clarke (1988), who have featured the notion of mental representations in their improvisation models (see chapter 2). In particular, these theoretical models are largely based on a type of "controlled improvisation", where "given musical material" (Pike, 1974: 92), also known as a "low-level musical unit" (Clarke, 1988: 8) or a "referent" (Pressing, 1984: 346), is used by the improviser to generate ideas.

Building on their work, this study drew from the theoretical work of Lehmann (1997) and Leman (2010) to explore how improvisers formed and used their perceived mental representations from a phenomenological viewpoint (see chapters 2 and 3). To reflect the improvisation models, a central feature of this study's design was having the improvisers learn a given musical stimulus in order to trace the formation and development of their perceived mental representations before, during, and after their improvisation (see chapter 3). Chapters 4 and 5 presented a descriptive case study of each improviser, where separate data sets (e.g. improvisation performance, drawings, observation, and verbal data) are interpreted through an analytic framework informed by Leman and Lehmann to examine how their perceived mental representations were formed (Leman, 2010) and used (Lehmann, 1997). Through this multimodal approach, the key findings of this study presented four ways of meaning constructions in mental representation formation, and twelve types of mental representations across three roles.

This final chapter, then, moves to discuss the 'so what' of these key findings. These include several recommendations for teaching music improvisation, the contributions and implications these key findings have on future research into music improvisation, and how the limitations the research design has impacted these key findings. As such, the conclusions of this study, drawn from the key findings based on two professional improvisers, can be summarised in three points:

1) **Improvisers' perceived mental representations are multi-various.** This conclusion refers to the multiple types of representations that have been identified, the multiple roles they take on, and the diverse qualities they have. In short, the multi-various nature of these mental representations reflects the dynamic complexity of the improviser's experiences, both during and beyond performance.
2) **The improvisers' perceived mental representations undergo progressive and distributive formations.** This conclusion refers to the multiple meanings that are involved in the formation of mental representations, and the multiple ways in which mental representations are constructed, which includes both involuntary and induced formations during and beyond performance. It also refers to the range of complexities of different types of mental representations.
3) **The improvisers' perceived mental representations take on multiple types of roles.** This conclusion refers to how mental representations can be used in many ways during and beyond performance. Such roles can range widely from engaging in different ways of memorising new music, to feeling inspired, and to the use of role-play and imitation, which can produce both emotional and physical effects.

The first conclusion answers the overarching question on what characterises the nature of the improvisers' perceived mental representations before, during, and after a thematic musical improvisation. Next, the second conclusion answers the question of how meanings are implicated in the formation of improvisers' perceived mental representations. Lastly, the third conclusion answers the question of what roles are evidenced in the improvisers' uses of their perceived mental representations. Each of these points and their implications are unpacked in the following four subsections.

7.1 Characteristics of two improvisers' mental representations

This section discusses each of the above three conclusions with support from the literature. It is split into four subsections, and concludes with several implications for music educators and music students.

7.1.1 Multi-various nature

The perceived mental representations of the two improvisers are multi-various in the sense that they have diverse qualities and exist in multiple forms. This multi-various nature is evidenced by the key findings in several ways. First, the diverse qualities of these mental

representations are shown by the multiple meanings that the improvisers have constructed within them. In particular, the improvisers often constructed different types of representational, referential, causal, corporeal, and collaborative meanings within one mental representation, which lends support to Goldman's (2016) proposal that improvisers' "representations could differ…in their complexity…[and that] [r]epresentations could be more multi-modal than those of non-improvising musicians" (p. 125).

The improvisers' perceived mental representations are also multi-various in that they are formed in multiple ways involving four kinds of meaning constructions. Furthermore, this multi-various nature is strongly evidenced by the multiple types of mental representations that improvisers use. For example, the different types of goal-based mental representations identified in this study corroborate with Berliner's (1994) statement that improviser's "ideas can assume different forms of representation. Improvisers sometimes emphasize aural thinking. At other times, they emphasize theoretical thinking." (p. 175). Thus, the multi-various nature of the improvisers' perceived mental representations in this study suggests that mental representations are indeed "an integral element of…improvisation" (Godoy and Jorgensen, 2001: 181), and should be considered a valuable skill that can be taught to students (Lehmann, 1997).

7.1.2 Progressive and distributive formations

The key findings of this study found evidence that the two improvisers constructed six types of meanings that align with Leman's (2010) framework of embodied music semantics during the formation of their perceived mental representations. The way these meanings are constructed can affect the formation of the improviser's perceived mental representation in a progressive or distributive manner.

The improvisers' perceived mental representations are formed progressively during moments situated 'outside' of a performance, which include the learning, ideation, and the reflection phases. This can be seen in how both improvisers had gradually built, through the processes of meaning construction, development, expansion, and revision, a production-based mental representation with several meanings. The way in which these meanings are developed and organised, especially during the improvisers' learning phase, resonate with Goldman's (2016) proposal that:

> "The organisation of knowledge in improvisers may be what gives them the ability to improvise. Different kinds of knowledge allow for different kinds of movement and

> interaction. To have one's musical knowledge organised in an improvisatory way…allows one to improvise. The question becomes one of understanding how an improviser's musical knowledge is structured and how that underpins their musical behaviours" (Goldman, 2016: 115)

This type of progressive formation of mental representation is corroborated by the notion of a "mental map" (Noice et al., 2008: 74) or a "personalized representational maps of pieces" (Berliner, 1994: 171), where jazz improvisers develop unique and complex understandings of a piece of music. As such, it shows how improvisers use multiple ways to learn new music as part of their practice.

Meanwhile, that the improvisers' perceived mental representations could also undergo distributive formations in moments situated 'inside' of a performance, such as during an improvisation, means we can conclude that, as improvisation is highly spontaneous it forces improvisers to form simpler forms of mental representations than what they can afford to form during the learning phase. In contrast to a progressive formation process where many types of meanings are formed and developed in one mental representation, distributive formations are characterised by the distribution of multiple meanings among many different types of mental representations. This leads to the conclusion that improvisers are good at being efficient with what kinds of mental representations to form under time pressure. Thus, students should be taught how to form many kinds of meanings and use them within multiple types of mental representations. For example, Berliner (1994) offers an example:

> "Like the improviser's store of musical knowledge, the ideas that occur during a solo assume different forms of representation: sounds, physical gestures, visual displays, and verbalizations. Each potentially involves distinctive thought processes and distinctive qualities of mediation with the body." (Berliner, 1994: 206)

In particular, Berliner's description shows how during improvisation, an improvisers' "distinctive" thought processes and qualities of mediation are distributed among different types of sounds, physical, visual, and verbal based mental representations. Thus, the progressive and distributive formations of the improvisers' mental representations show the improvisers' adaptive abilities to form mental representations that are appropriate to a learning or performing context.

7.1.3 Multiple types of roles

The key findings showed strong evidence that two improvisers in this study had used (i) goal, (ii) production, and (iii) reflection based mental representations that are similar to Lehmann's (1997) tripartite model of acquired mental representations. In particular, the improvisers used

multiple types of mental representations within each role. In total, twelve types of mental representations were identified across the two improvisers' learning, ideation, improvisation, and reflection phases. These included four types of goal-based mental representations, four types of production-based mental representations, and four types of reflection-based mental representations.

The notion of improvisers' perceived mental representations taking on different types of roles, is supported by Berliner (1994), who stated that, "different mental images sometimes occur simultaneously to reinforce the same musical pattern" (p. 207). Similarly, Norgaard (2008) also reported the way five expert improvisers have monitored and evaluated their performance "along several dimensions" (p. 177), which indicates the presence of different types of reflection-based mental representations. Lastly, Hargreaves (2012a) proposed that improvisers might use, among others, strategy-generated ideas, audiation-generated ideas, and motor-generated ideas, lending support to the multiple types of production-based mental representations that are also found in this study. Thus, the multiple types of mental representations identified in this study show the improvisers' multiple ways of knowing, thinking, and acting during and beyond performance.

7.1.4 Implications

The three main conclusions above have several implications for music educators and music students. In particular, they offer possibilities for developing, through future research, a variety of teaching and learning tools in music education. For one, the many and varied forms of mental representations imply a large degree of flexibility in terms of their applications in various music educational contexts and with different age groups. Young or beginning students, for instance, may be taught to form and use more simple representations (e.g. imagining sound of raindrops), while advanced students may be taught to produce more sophisticated representations (e.g. visualizing contrapuntal lines).

Given the wide range of modalities and dimensions that mental representations are known to encompass, and that they have qualities which reflect the uniqueness of each person, mental representations may also provide a common starting point for teachers and students to understand each others' teaching and learning experiences. For example, Lehmann (1997), among others, has pointed out that advanced music students are often "unable to listen to themselves accurately" (p. 156), which may bring difficulties into teaching. For teachers, then, investing in ways to understand their students' mental representations may assist them to

better recognize the many ways different students learn a same piece of music, and to provide the necessary instruction to support that individual's learning process. For students, putting in efforts to understand their teachers' mental representations may help them to better see the intentions behind specific teaching approaches, such as projecting their playing and learning to imagine what their performances sound like from the back of a hall.

Lastly, acknowledging that mental representations may undergo a variety of involuntary or induced formations may assist musicians in becoming more adaptive and in control of their experiences. In particular, considerations should be given to the appropriate uses of various mental representations in relation to different performing and learning contexts. Drawing from the findings in this study, for instance, while forming complex mental representations are deemed helpful during music learning, it may be less helpful for musicians to form overly complex mental representations, or intrusive self-based representations that involve excessively critical thoughts during performance. As such, students should be taught on how to form their mental representations in various ways, and how to use different types of mental representations during practice and performance (Holmes, 2005; Dalagna, 2013; Keller, 2012).

7.2 Recommendations

Building on the conclusions and implications drawn from the key findings, this section puts forward three recommendations, which are unpacked in the following three subsections. Given that further research is first needed on the application of these mental representations in an educational context, the following proposes a more general set of recommendations.

7.2.1 Rethinking the musical improvisation process

While the use and formation of mental representations exists in several musical domains outside of improvisation (Holmes, 2005; Keller, 2012; Hargreaves, 2012a), there is evidence to suggest that the mental representations of improvisers may be different from the musicians in other practices (Goldman, 2016; Lehmann and Ericsson, 1997). In particular, Goldman (2016) has suggested that improvisers demonstrate a type of "knowing in an improvisatory way" (p. 100), which emphasizes on "the role of connecting auditory perception with the motor system" (p. 103). In this study, the two improvisers' constructions of causal, corporeal, and extra-musical meanings in several types of instinctive and simulated production-based

mental representations indeed show strong connections between aural, movement, and even emotional associations.

In addition, Després et al. (2017), Norgaard (2008), and Hargreaves (2012a) have suggested that improvisers are flexible and adaptive at switching between different types of thinking strategies during an improvisation. The points on the improvisers' different ways of knowing and thinking suggests that the process of improvisation involves a high-level of ability to rapidly form and manipulate complex mental representations not only of the performance, but also of one's own experience, the audience, and other contextual aspects (Lehmann, 1997). In addition, the mental representations are always formed as part of a dialogue between the improviser and his or her surroundings. As flutist David Toop from Burnard's (2012) study of improvisational creativities in practice states: "it's never just the self, it's always some…exchange with an acoustic space, a physical space and the audience" (p. 156). Improvisation, then, can be thought of as a dynamic process where the improviser forms and engages with multiple types of mental representations of the performance, the self, and the surrounding. When viewed in this way, improvising is slightly demystified in that it becomes an activity where one can use relatable associations and thoughts to form and generate ideas. For music educators, then, the teaching of improvisation might include training students how to form vivid goals, as well as learning how to listen to oneself accurately during performance, thus forming a sufficient reflection-based mental representation.

7.2.2 Raising awareness of mental representations in piano pedagogy

As the improvisers in this study and the musicians in other studies have shown (Lehmann, 1997; Holmes, 2005; Keller, 2012; Godoy, 2001; Hargreaves, 2012a), mental representations, voluntary or not, are always present in any musical activity. However, in order to use one's mental representations, this means that one must first learn to become aware of them. A way to raise awareness of mental representations is to discourage students' use of rote memorisation by replacing this strategy with "more complex memorisation strategies" that encourage "the use of higher-level musical representations" (Lehmann and Ericsson, 1997: 54). Citing expert musicians as exemplars, Lehmann and Ericsson suggest that forming "more complex internal representations of a piece of music…allow experts to adapt to different performance problems" (p. 54). Indeed, the professional improvisers in this study, as well as in the study by Noice et al. (2008), had formed complex mental representations through the use of analytical, experiential, and associative thinking during the learning phase, as

evidenced by their constructions of referential, representational, causal, and corporeal meanings.

Raising awareness of one's mental representations might also be achieved by designing instructions that help educators to "identify the types of representations a student would most benefit from a given level of performance" (Lehmann and Ericsson, 1997: 55). In particular, Lehmann and Ericsson (1997) have proposed that the ability to construct and use appropriate mental representations is a skill that can be developed through training (p. 47). In particular, they have argued, that "only the careful study of experts' training activities will allow us to translate and adapt some of them to…novices and more advanced music students" (*ibid.*, p. 53).

7.2.3 Developing future research on improvisers' mental representations

Several scholars have raised the importance of encouraging students to learn from professional improvisers (Lehmann and Ericsson, 1997; Norgaard, 2008; Berliner, 1994). A way forward is to enable students to practice "thinking and acting like expert [improvisers] (Fidlon, 2011: 127). Doing so requires further research on understanding "the exact nature of [their] representations" (Lehmann, 1997: 152). As Lehmann (1997) has pointed out, "the mental representations that allow successful performance of rehearsed music may be different from those that facilitate…improvisation" (p. 143-144). One way to learn more about these various types of mental representations is to study how professional improvisers acquire them in the first instance. This is especially important, as previous studies have suggested that a key difference between music students and professional musicians lies in the latter's "ability to create a mental representation as an artistic desired outcome" during performance planning (Dalagna et al., 2013: 830). Having established mental representations as an indispensible tool in music learning, future research should study the mental representations of professional improvisers in different musical genres, from its initial conception, formation, development, to its roles in the actual improvisation.

In the field of musical improvisation, then, valuable future topics of enquiry might include more studies examining the differences between the mental representations of improvisers and non-improvisers (Goldman, 2016). Expanding on the present study and the research of Noice et al. (2008), future studies can also look at how memorising different kinds of musical (as well as non-musical) stimuli might affect the professional improvisers' formation and uses of their mental representations before and during the improvisation. Although the preliminary

findings from this study indicate that professional improvisers form different types of mental representations during the learning, ideation, improvisation, and reflection phases, more research is also needed to confirm whether "different mental representations underlie different task demands, or if the same mental representation is…accessed differently" (Lehmann, 1997: 154). Undertaking these suggested directions in future research may help bring us one step closer towards understanding "the origin of certain kinds of decision-making" (Pressing, 1988: 168) and the different "sources of idea generation" during the musical improvisation process (Hargreaves, 2012a: 12).

7.3 Limitations of the study

While this study's multimodal approach has helped gain further insights into the complexities of the two improvisers' perceived mental representations, it has also presented several challenges during the research process. These challenges, such as the limitations that arise from the study's research design, methods, analysis, and generalizability, are discussed in the following three subsections.

7.3.1 Generalisability

The aim of this study is to illuminate a better understanding of the intricate complexities of professional improvisers' mental representations, by looking in depth at how they are formed and used across two descriptive case studies. As such, the findings may not be generalised to other improvisers' perceived mental representations, just as the experiences of these two improvisers cannot be seen as a representative of how other improvisers learn, ideate, and improvise on a similar musical stimulus. Indeed, this study presents but one view of the improvisers' mental representations during key events of the preparation and performances of two separate improvisations, by two musicians at different times and locations.

However, "the findings from descriptive case studies are generalizable to theoretical propositions" (Tobin, 2010: 288), as the present study's design is informed by a priori theories from the framing of the research questions to the field and analytical procedures. In particular, the theoretical influences on the detail and depth of each case help to set firm boundaries and ensure the rigour of the research design, from which "robust concepts emerge, conflate, and expand to inform, confirm, refute, and further shape a priori theories" (*ibid*.). Moreover, Royer (2010) states, "a single case differing on several dimensions can be enough because the number of dissimilarities matters more than the number of cases" (p. 614). Indeed,

the two improvisers in this study, which involves "research aiming at building theories" (*ibid.*, p. 615), provided multiple sources of evidence that help to lay out patterns and connections in relation to previous improvisation models. In addition, the use of rival theories from Lehmann (1997), Pressing (1988), Clarke (1988), and Pike (1974), among others, is a critical feature of descriptive case studies in terms of enhancing the robustness of the study (Tobin, 2010: 288). As such, the "relative features" between the two improvisers "in terms of similarity and dissimilarity are more important than their intrinsic features because cases are instrumental in serving theoretical purposes" (Royer, 2010: 614).

Thus, the descriptive case studies in this research can be seen as functioning on two levels. On the one hand, they are intensively focused on a particular "small set of cases", while still aiming to "generalize across a larger set of cases of the general type" (Gerring, 2007: 65). In the present study, these generalisations may include cases that are relevant to the descriptive theory, which, in this research, was developed from a priori theories.

7.3.2 Critique of research design and methods

In seeking to better understand the different ways improvisers learn and perform music, the rich and varied data sets in this study, obtained from multiple tools of data collection, were indeed able to capture different views into the improvisers' thinking. While the different sources of spoken, musical, and visual evidence provided ample triangulation between the data and the analysis, the method for each form of data collection also had its limitations. These limitations are particularly evident in three methods that were used: observation, graphic elicitation, and music elicitation.

In observation, the difference in the setup between the two improvisers' interviews was perhaps this study's greatest limitation. Given that one interview was conducted over Skype with an improviser from New York City (U.S.A.), and another was conducted in person with an improviser from Birmingham (U.K.), the recorded sound and video quality between the two interviews varied (see Sections 4.1 and 5.1). While there are no issues with the spoken data, the more subtle dynamics in the improvisations performed during the Skype interview is at times slightly distorted. Although both improvisers participated in a similar semi-structured interview format within a familiar setting from their homes, the interactions over Skype are nevertheless restrictive. As such, the opportunity to observe subtle information, such as the nuances of the improviser's facial expressions and body language, was inevitably missed.

In graphic elicitation, the quality between the two improvisers' drawings varied greatly (see Sections 4.5 and 5.5). The drawings from the Birmingham based improviser were significantly more detailed than those created by the New York based improviser. This variability was attributed to the use of Google's drawing platform in the Skype interview. The Google platform, which required the use of a mouse, proved to be more limiting to use compared to creating drawings on paper (see Section 5.1). In hindsight, it may have been better for the New York based improviser to draw with a paper and a pen, and then immediately send over a scan of the drawings, so that specific questions about it can be asked during the Skype interview. However, the Google platform enabled both parties to observe the creation of the drawings in real time, which was later useful for matching different parts of a drawing to the music it represented (see Section 5.5).

In music elicitation, the depth of the improvisers' responses to the recording of the musical stimulus and their improvisation performances were at times inconsistent. First, one improviser eventually recognised the musical stimulus while the other improviser did not (see Sections 4.2 and 5.2). However, the other improviser's lack of familiarity led to the creation of several unique associations that resulted in an interesting finding of a significantly different improvisation (see Appendix A.2). While this study aimed to follow the tradition of aural transmission in many improvising genres, having the improvisers learn the musical stimulus solely by ear may have also been too restrictive compared to having options of learning both from a music score and a recording (see Sections 4.1 and 5.1). At the same time, the recording provided the improvisers with additional information in articulation, phrasing, and timbre nuances that are otherwise unavailable from a score. Learning the stimulus aurally also revealed the improvisers' strong linkages between their ears, bodies, and their instruments (see Sections 4.2 and 5.2). In addition, clearer instructions for reflecting on one's improvising experiences could have been provided during the retrospective think-aloud protocol. One improviser, for instance, had commented about his experiences while simultaneously listening to a recording of his improvisation, while the other improviser commented only afterwards (see Sections 4.4 and 5.4). As a result, the matching of the spoken data with the musical data during the analysis proved to be more difficult for the latter.

Limitations are also found in the sampling and interview questions. First, the sample was not as diverse as it could have been, as this study did not include the experiences of female participants as well as professional improvisers from different age groups. Both of the improvisers are middle-aged Caucasian males and were selected based on their availability

and willingness to participate in this study. However, the two improvisers provided musically divergent profiles, both specialising in different genres with very distinct performing experiences (see Sections 4.1 and 5.1). Second, the open-ended interview questions yielded mostly responses about the improvisers' associative or emotional experiences, and less about the theoretical or technical aspects of their performances. This may partly be due to how I had presented myself to my participants as a non-improviser, and thus as an 'outsider', who wished to study them as professionals in their respective improvisation fields. As such, the improvisers may have used more common terms to share their experiences with me, instead of more specialist terms that are normally used to converse with other improvising musicians.

7.3.3 Critique of analysis

Given the many forms of improvisers' mental representations that are known to exist (Berliner, 1994; Pressing, 1988), this study necessarily adopted a multimodal methodology involving the different analyses of various data sets in order to study the multiple dimensions of this phenomenon (see Section 3.5). However, the analysis was limited by a lack of precedence for accessing and systematically and examining the experiential aspects of improvisers' mental representations. To counter this, I developed a conceptual lens informed by the theoretical works of Lehmann (1997) and Leman (2010) to access, identify, and describe the improvisers' perceived mental representations, which was guided by the theoretical framing of the research questions, the research design, and the analysis (see Sections 2.5, 3.3, and 3.5). In particular, the research questions narrowed this study's scope to identifying three types of mental representations, and six types of meanings to systematically 'lift' out from the data, the descriptive units of analysis as access points for examining the improvisers' perceived mental representations.

Although there are studies of expert-level improvisers that feature verbal and musical data (Norgaard, 2008; Fidlon, 2011; Chamblee, 2008), and studies that feature verbal and visual data to study adults (Bamberger, 1991; Davidson et al., 1988; Shockley, 1980) as well as children's mental representations in music learning (Burnard, 1999; Elkoshi, 2004; Barrett, 1997, 2000, 2001; Davidson et al., 1988), there are no known procedure for synthesising all three data sets, in order to maintain a coherent view of the manifold dimensions of the improvisers' mental representations. To address this, each set of data underwent iterative cycles of inductive and deductive analysis (Bassett, 2010), culminating in a final cycle of analysis where different types of IPA, musicological, and MSC analyses were interpreted

through the same Lehmann and Leman-informed analytical framework, in order to ensure rigour and coherency in the presentation of both descriptive cases (see Section 3.5).

The analysis is nevertheless limited by the fact that accessing improvisers' mental representations will always be indirect. In particular, exploring professional improvisers' *perceived* mental representations from a "phenomenological viewpoint" (Leman, 2010) necessarily involves an approach that "probes musical imagery by means of introspection" and "provides a description of our…experiences in terms of a verbal report of imagined objects and associated strategies" (p. 58). Additionally, Godoy (2001) notes that, "one consequence…is that we have to deduce, assume, or simply guess a number of things from other sources" as well as "rely on introspective accounts of our mental images" (p. x). Thus, the present study's findings and discussion refer only to the concept of *perceived* mental representations, and the empirically driven concepts of mental representations, including the processes of encoding and the low-level units of schemas in short and long-term memories (Snyder, 2001) are beyond the scope of this study.

In his framework, Leman (2010) argues for (and acknowledges the challenges of) combining both phenomenological and empirical methodologies in order to develop a multimodal approach that can thoroughly investigate mental representations in the process of meaning formation. In light of this, the analysis based solely on a phenomenological enquiry is inevitably limited by its narrow scope and subjective nature. Having completed a partial implementation of Leman's framework from a phenomenological standpoint, however, this study comprises the first stage of developing a multimodal approach that will progress towards a more empirical phase for studying improvisers' perceived mental representations in future work.

In sum, this section has discussed the present study's limitations in terms of its generalizability, method, design, and the analysis approach. While many aspects of the research process can be improved, the issues of quality, trustworthiness, and rigour were ensured through this study's use of a theoretically driven, multimodal, and iterative research design.

7.4 Contribution to knowledge

To my knowledge, this study is the first to use professional improvisers' perceived mental representations as a conceptual lens to examine their improvising experiences. In doing so, it

has established four key markers, as outlined by Tracy (2010: 846), that indicate a study's significant contributions. These four key markers can be identified in the following parts of this thesis: (1) demonstrating *theoretical significance* in chapters two and six; (2) demonstrating *methodological significance* in chapter three; (3) demonstrating *practical significance* in chapter seven; and (4) demonstrating *heuristic significance* in chapters one, four, five, six, and seven. Through these ways, four contributions to knowledge are made from this research.

This study has demonstrated a theoretical significance in three ways. First, this study has identified 'transitional zones' (Lewis and Grimes, 1999: 675) between several improvisation models and empirical studies from music psychology (Pressing, 1988; Clarke, 1988), phenomenology (Pike, 1974), and ethnography (Berliner, 1994) that all feature the concept of *mental representations*, resulting in a "paradigm bridging" (Lewis and Grimes, 1999: 674) across several fields of music improvisation research. Second, various notions of 'mental representations' from different fields have been brought together to be reframed and delineated through Lehmann's (1997) model, where several hidden assumptions are questioned and made explicit in order to establish a common ground for understanding this oft cited yet elusive phenomenon. Third, this study has built on and extended Lehmann's (1997) model to include the context of musical improvisation, which in turn, illuminated further insights and forged new connections to previous improvisation models.

Next, this study has demonstrated a methodological significance through its design, methods, and analysis approach. First, it has used a qualitative research design to bring empirical evidence to different types of mental representations used by improvisers, a topic that has been largely examined through a purely theoretical or a quantitative approach. Additionally, the use of two descriptive case studies is significant as it provides the necessary depth to thoroughly examine the complex phenomenon, while also enabling the research to build and extend on previous theoretical work of improvisation. Second, this study has incorporated music and graphic elicitation methods in several ways that capture a holistic view of the improvisation process by focusing on "the creator and the creation of the work" (Cohen, 2010: 82). Together, the use of the musical stimulus, the retrospective think-aloud protocol, and drawings enables the collection of multimodal forms of "data…before, during, and after a creative act", including "the exposure of ideas available to the [improviser]" and "sufficient original material" afterwards for study (*ibid*.). Third, the study's "multiparadigm" analysis approach has successfully brought together verbal, musical, and visual data sets by analysing

the data iteratively through multiple phenomenological, psychological, and musicological lens, thereby constructing "differing insights enabled by each paradigm", while also ensuring rigour and coherency in the data presentation (Lewis and Grimes, 1999: 681).

Finally, this study has demonstrated a practical significance by providing implications and specific recommendations for educators, musicians, and researchers. For educators, the findings offer a yet another view for understanding and optimising the different ways students might learn and improvise music. For musicians, knowledge on the various formations and roles of mental representations may offer an effective yet personalised approach for preparing for performances in different contexts. For researchers, the present study has provided a tangible access point for investigating improvisers' perceived mental representations through a qualitative approach. Interconnected with this contribution is the present study's heuristic significance. In particular, it has laid the preliminary theoretical groundwork of improvisers' mental representations, supported by multiple paradigms, upon which future research can be built. In doing so, this study has merged and expanded on previous concepts "that can be further questioned and explored in other settings", which will hopefully "influenc[e] a variety of audiences" and lead to a generation of further research on improvisers' mental representations (Tracy, 2010: 846).

7.5 Epilogue and final reflections

Towards the end of my research journey, I was eager to apply the findings from this study to my own experiences of improvising, as a way to reflect actively again on my early improvising experiences in Section 1.1. In addition, Ron, who is a passionate teacher, was keen to see me improvise as much as I was writing about the topic. As such, I took two short improvisation lessons with Ron through Skype on 18th and 22nd August 2017. In the final Section of this thesis, then, I present my reflections of my own, more recent improvising experiences.

Over the course of two lessons, my teacher, Ron, gave me three daily exercises to start out, as the following box shows.

Box 7.1: Summary of my improvisation lessons with Ron

1) Stars in the sky: I was told to hold down the damper pedal and play to single notes on the piano, while imagining that each note is a star in the sky. Ron and I had actually performed this first exercise as a duet, where I would play one note, and he would play another in response.

2) Deep outer space: I was to imagine that I was in deep outer space, and to play any gestures of notes with the damper pedal down, with each gesture representing something/movement in space (e.g. galaxy, shooting star, black hole, super nova, planets, etc.). Ron and I also tried this exercise as a duet.

3) Flowing water: I was to play on only the white notes an ascending six-note scale in a repetitive eight-note rhythmic pattern with the damper pedal down. I could start on any key after each repetition. Although Ron called this a 'flowing water' exercise, I was told to not think of anything, not even imagery, but just to play and get my fingers moving. During the lesson I played this exercise alone as a solo.

4) Shenandoah theme: I was told to set the timer for twenty minutes and to play the melodic theme from the American folk song, 'Shenandoah', in as many ways as I can for twenty minutes non-stop. I was not required to always play through the entire melody; if I found a part of melody interesting, I could explore those notes. The point of the exercise was to keep my ears open and to see what aspects of the melody I am interested in developing further. I did not play this during the lesson but afterwards as a daily exercise.

While I was playing through these exercises with Ron during and after the lessons, I found myself labelling these exercises as various ways of training myself to form and use different types of mental representations that are similar to the ones I am researching in this study. I ascribed the first exercise as mainly training my idea goal-based mental representation, where I can use single notes (a relatively simple production task) to focus on portraying my extra-musical associations to my image of stars in the sky.

The second exercise for me was to develop an interaction between my idea goal-based representation and instinctive production-based representation. While I was portraying an extra-musical image of deep outer space, I occasionally formed corporeal associations, where I needed to think more about how to produce some of the gestures and patterns, as I found it to be more complex than working with just single notes. However, most of the time my associations were causal-based, as I had instinctively played the notes I heard in my head.

The third exercise was a way to train my instinctive production-based mental representation, because I mostly focused on how my fingers were moving and where they were going on the keyboard. Although I did form very short-term strategic goals (e.g. what note to start on for my next sequence), these were not the same type of global, long-term goals like the 'stars in

the sky' and the 'deep outer space' exercises, where I had to maintain the same image throughout the entire improvisation. I also found myself not forming any extra-musical associations, despite it being called a "flowing water" exercise.

Lastly, the fourth exercise is much more advanced, and this is where I am training myself to use all three kinds of goal, production, and reflection-based mental representations and to strengthen the efficiency of the interactions between them. As I cycled through the 'Shenandoah' theme through free association, I also found myself intra-musically connecting particular motives to the musical styles of Maurice Ravel and John Adams.

I believe that Ron's exercises are appropriate for me as a novice improviser, as they enable me to gradually form each of my mental representations, and to know how to use them. As I become more advanced, I believe that Ron will start to give me exercises that will help me add more details and complexity into each type of mental representations. These exercises will also train me to construct more complex interactions between these mental representations.

In closing, as I reflected on my improvising experiences from these lessons, I realised that I, too, had demonstrated multiple ways of knowing, thinking, and acting during my improvisations. Yet, it is through the conceptual lens of 'mental representations' that such thoughts are made explicit, enabling myself to glimpse into my own, fleeting world of brainstorming activities.

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List of appendices

Appendix A: Musical analysis of improvisations

A.1 Stuart's improvisation: Eleven variations and coda in sonata form

This section presents Stuart's keyboard improvisation on "Answer Me". A musical analysis revealed that his improvisation comprised eleven variations and a coda, which are grouped into a three-part musical structure, also known as an *A-B-A'* or a *sonata* form. Section A opens in the key of F major and comprises the first three variations. Next, Section B modulates into d minor, comprising variations four to seven. Lastly, Section A' returns to D major, which comprises variations eight to eleven before concluding with a coda. In the following section, a musical analysis of each variation is presented individually.

A.1.1 Variation One: New rhythmic and melodic motifs in F major (0:00)

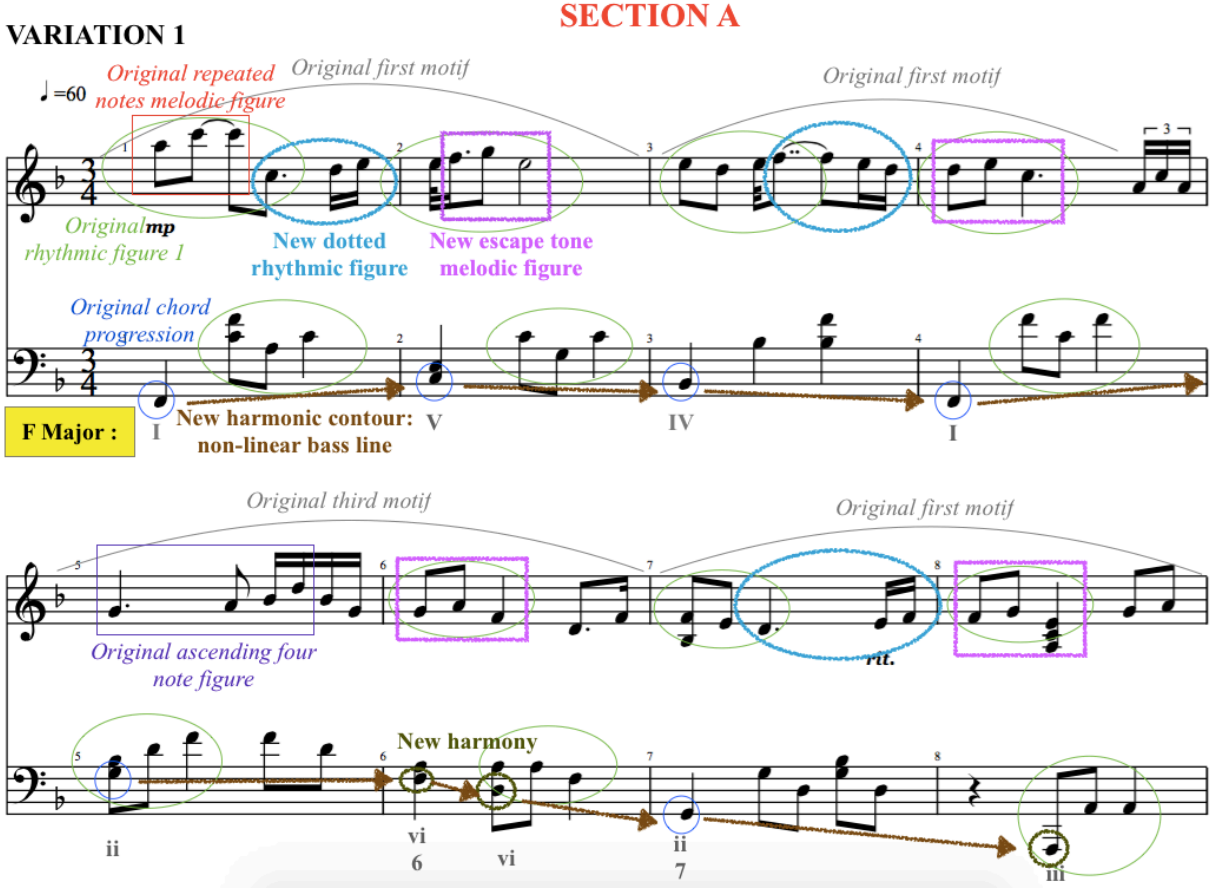


Figure A.8: Musical analysis of variation 1 from Stuart's improvisation.

This variation is the first of three consecutive variations that comprise the A Section in Stuart's improvisation. Having transposed the theme to F major, Stuart opens his improvisation softly with a broad, larghetto tempo, an easy pace that is slightly slower than

the original theme. His right hand, being only a fifth higher from the original starting note, sings from a similar register on the piano. The structure of the original first motif is immediately identifiable in mm. 1-2, flagged by the ascending repeated note figure (shown in the red box) and the short-short-long rhythmic patterns (circled in green).

As Stuart continues to outline this motivic structure in the next two measures, two new variants recur. The first is a rhythmic figure with a dotted eighth note followed by two semiquavers (bold circled in teal) located in m. 1. The second is an angular melodic figure with an 'escape tone' (shown in a bold plum box) located in m. 2, where the melody proceeds up a step then 'escapes' by skipping in the opposite direction.

In mm. 5-6, Stuart brings in the structure from the third motif by outlining the triad of the minor ii chord – a diminution of the melodic arc (shown in the purple box), and pairing this with his new escape tone melodic figure that had first appeared in m. 2. By mm. 7-8, his new rhythmic and melodic variants from the first two measures reappear again with the familiar structure from the first motif.

Thus far, Stuart has used the structures from the first and third motifs only, yet to our ears, he seems to have presented the complete aural blueprint of the original theme. This is because, aside from mm. 6 and 8, he had retained almost the entire original harmonic progression (circled in blue). However, Stuart had masked this detail by departing from the descending 'lament bass' line contour. Instead, he chose to highlight the original chord progression with a waltz-like accompaniment, emphasizing the first down beats with the root notes. This results in a more angular harmonic contour (indicated with brown arrows), which opens a way for Stuart to incorporate the rhythmic figure from the first motif (circled in green).

A.1.2 Variation Two: New triplet motif (0:26)

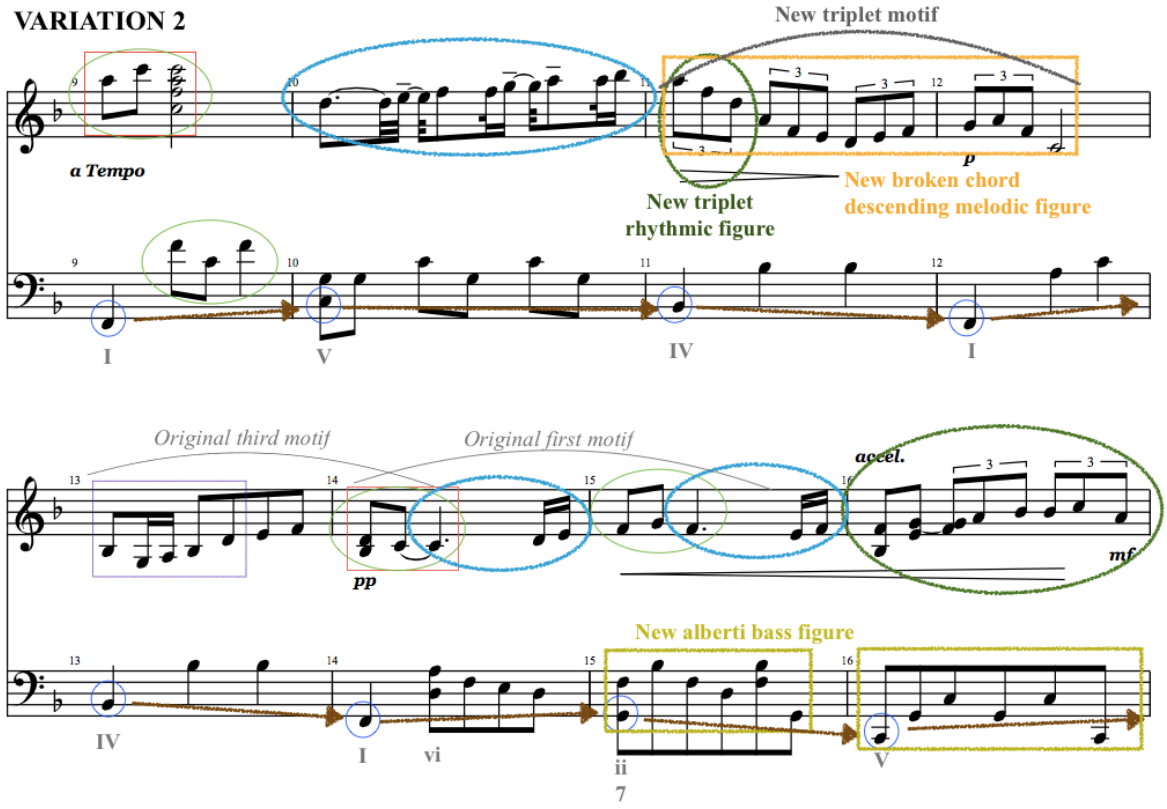


Figure A.9: Musical analysis of variation 2 from Stuart's improvisation.

A bold restatement of the ascending repeated melodic figure (shown in the red box) over a solid I chord signifies the start of a new variation. As the phrase continues into m. 10, Stuart departs from the structure of the first motif, elaborating instead on his dotted eighth note and semiquaver rhythmic figure (bold circled in teal) for the entire measure. Immediately after, Stuart introduces a new triplet rhythmic figure (bold circled in dark green), which evolves into an entirely new motif in m. 11 – a descending melodic figure briefly outlining a d minor broken triad (shown in the bold orange box).

The underlying original harmonic progression, however, remains prominent as it guides our ears back to the structure of the third motif in m. 13, where a variant of the melodic arc figure – an outline of the ii chord – reappears (shown in the purple box). As the melody progresses into mm. 14-15, a rapid return of the first motif's structure is heard from a repetition of the short-short-long rhythm (circled in green), along with the recurrence of Stuart's new dotted rhythmic figure (bold circled in teal).

At this point, the accompaniment had arrived to an ii-V chord progression, and adopts a new texture to build on the harmonic tension: a variant of the alberti bass interspersed with harmonic intervals (shown in the bold mustard yellow box). Propelled by the movement of the accompaniment, Stuart accelerates the tempo in m. 16, and brings in his new triplet rhythmic figure (bold circled in dark green) with a dramatic crescendo that builds towards the climax in the next variation.

A.1.3 Variation Three: New arpeggio figure (0:54)

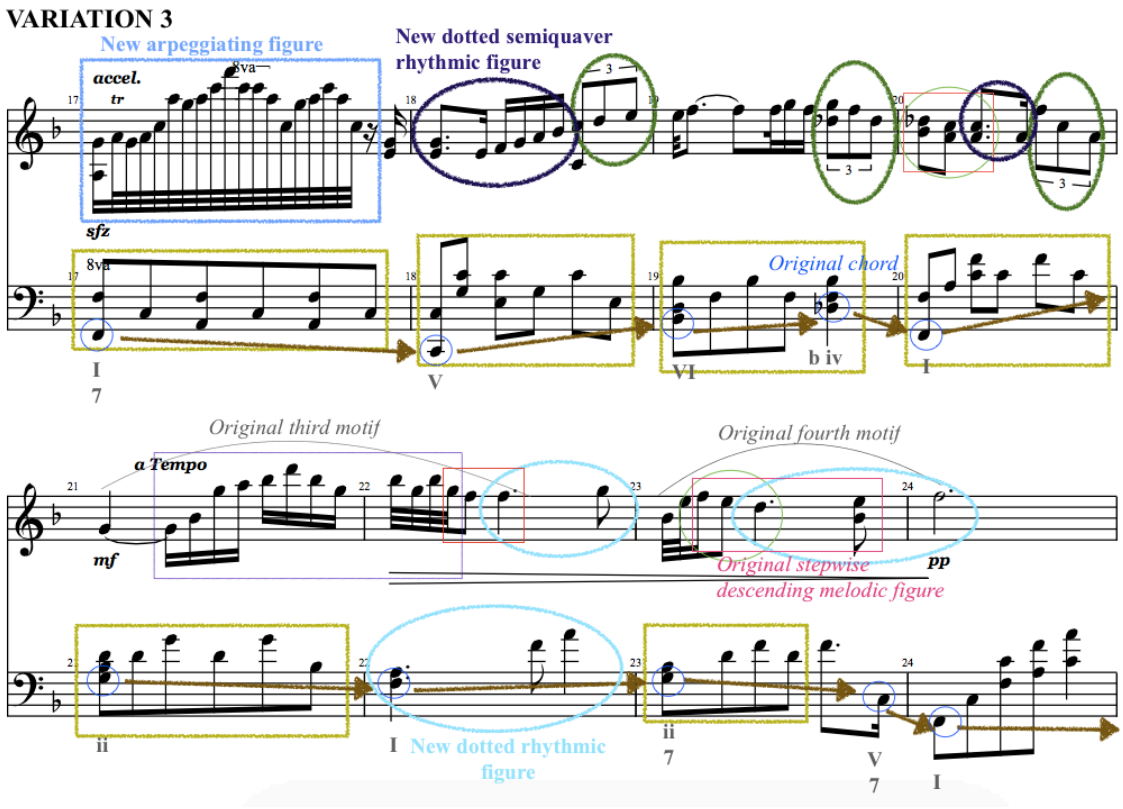


Figure A.10: Musical analysis of variation 3 from Stuart's improvisation.

Continuing in his accelerated tempo, Stuart starts the third variation with a powerful *sforzando* chord, followed by a sweeping arpeggio melodic figure (shown in the bold light blue box) that stretches over two octaves higher. At this point, the registers of both the melody and the accompaniment have expanded dramatically from their original ranges. The intensity of the overall dynamic level is accentuated by the addition of octaves and the use of wider intervallic chords in the left hand alberti bass accompaniment.

In m. 18, a new rhythmic figure emerges in the right hand – a dotted eighth note followed by a group of five semiquavers (bold circled in dark purple). Over the next three measures, Stuart alternates between this new rhythmic figure and the triplet rhythm (bold circled in dark green).

Apart from a brief statement of the repeated note motif (shown in the red square) and its short-short-long rhythm (circled in green), there are no identifiable elements from the structure of the first motif. In m. 21, Stuart recedes back to his original tempo. At the same time, the structure of the third motif reappears, indicated by the arrival of the ii chord from the original harmonic chord progression, the melodic arc figure (shown in the purple box), and its original accompanying rhythm (shown in the red box).

As Stuart starts to lower his dynamic level over the next three measures, a new dotted rhythmic figure (bold circled in bright turquoise) appears in m. 22 in the accompaniment. This rhythmic figure appears immediately again in the melody within the same measure, like a stretto. In mm. 23-24, Stuart uses the structure of the original fourth motif for the very first time: a descending stepwise melodic figure (shown in the dark pink box), paired with the short-short-long rhythm (circled in green). Having taken us through three consecutive variations that never fully resolve, the appearance of the fourth motif at this moment provides a prominent feeling of closure.

Within the structure of the fourth motif, the melody concludes over an I chord with the new dotted rhythmic figure (bold circled in bright turquoise) that was introduced earlier in m. 22, marking the end of this variation and the Section A of Stuart's improvisation.

A.1.4 Variation Four: New melodic figures in D minor (1:14)

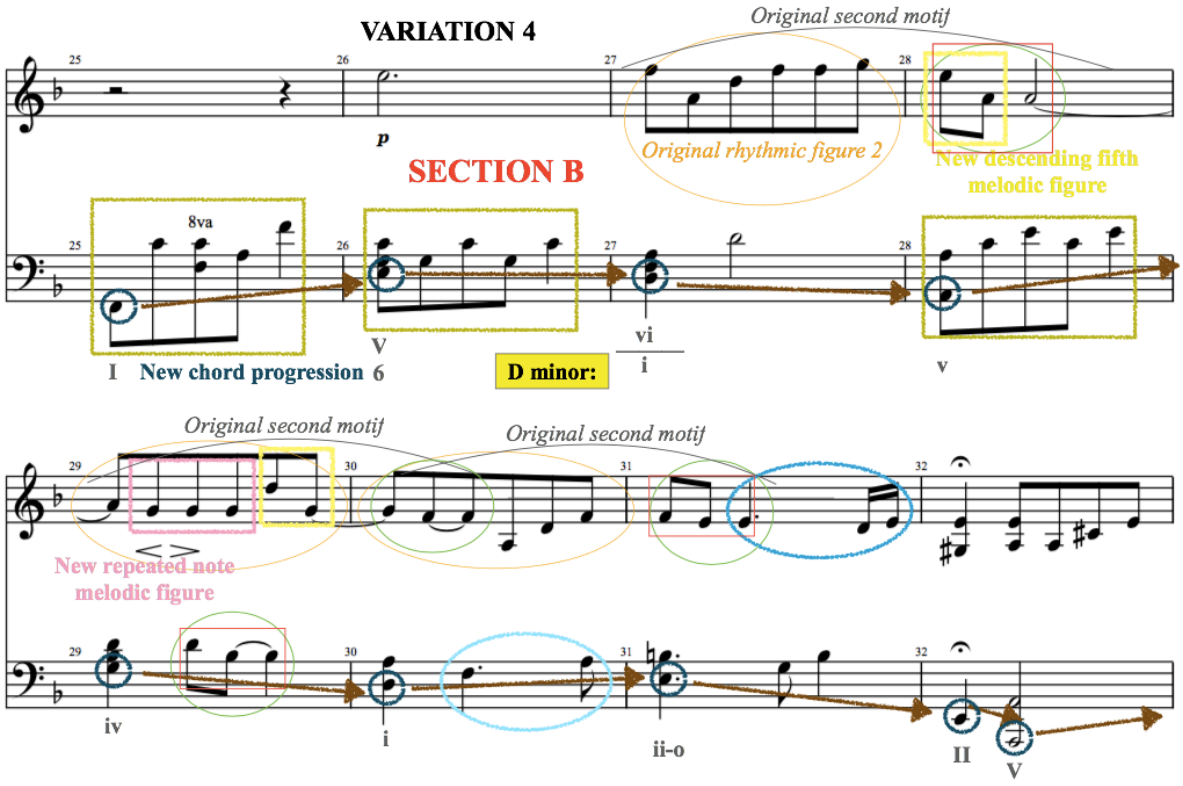


Figure A.11: Musical analysis of variation 4 from Stuart's improvisation.

Variation 4 marks the second part of Stuart's improvisation; an extensive B Section that continues up until variation 8. At this point, Stuart has departed from the original harmonic progression (bold circled in dark teal), taking the improvisation into a new tonal direction, which continues for the rest of this variation. By m. 27, Stuart swiftly modulates to a relative key of d minor. Over the i chord of d minor, he states the entire rhythmic structure of the original second motif for the first time: a sequence of six eight notes (circled in orange).

Immediately after, a new descending fifth melodic figure appears in m. 28 (shown in the bold yellow box). This is the largest melodic leap that Stuart has employed thus far, whereas previously his improvised melody tended to progress mostly in stepwise fashion with a few third or fourth leaps. Playing with the eight note rhythmic motif, Stuart explores the expressivity of repeated notes as a new melodic figure in m. 29 (shown in the bold light pink square). The effect of the repeated g notes is particularly highlighted by the use of a subtle hairpin – a crescendo followed by an immediate decrescendo, and the contrasting reappearance of the new descending fifth melodic figure.

Meanwhile, the texture of the left hand accompaniment has become considerably thinner, with the sparser number of notes leaving room to showcase the new dotted rhythmic figure (bold circled in bright turquoise) from variation 3. Reflecting the melancholic mood of d minor, the melody heavily descends to the middle range of the piano, which is lowest register the melody has traversed to thus far. Stuart's dotted eighth note and semiquaver rhythmic figure (bold circled in teal) from variations 1 and 2 resurface in m. 31.

The improvisation comes to a standstill at m. 32 as Stuart pauses on the II chord (indicated by a fermata), letting the g-sharp note, which was previously a g natural note in just m. 29, settle in our ears. As he slowly moves on to the next chord, our hearing is drawn towards the harmonic tension from the new c-sharp note, which colours the now V chord. As this transition Section closes, our ears anticipate a full return of the d minor tonic for the start of the next variation.

A.1.5 Variation Five: New syncopated rhythmic figure (1:43)

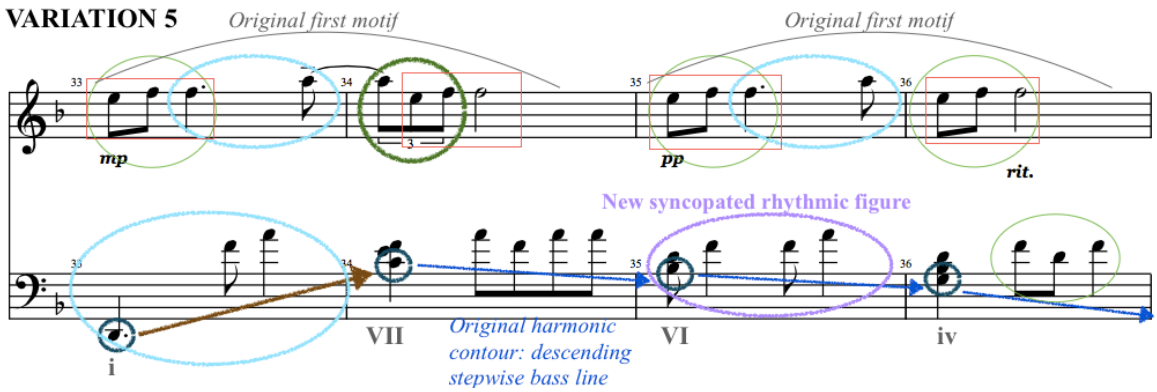


Figure A.12: Musical analysis of variation 5 from Stuart's improvisation

In variation 5, the melody, returning to the high register of the piano, opens quietly and tentatively, while the accompaniment becomes more restricted in its range from this point onwards. Now rooted firmly in the key of d minor, the melody proceeds as a melancholic aria over a sparse accompaniment, conveying a solemn mood. Stuart slowly starts with the rhythmic (circled in green) and melodic elements (shown in the red box) from the first motif in mm. 33-34. Within this structure, he reintroduces his dotted rhythmic figure (bold circled in bright turquoise) and triplet figure (bold circled in dark green).

As Stuart repeats the structure of the first motif again in mm. 35-36, he produces a new syncopated rhythmic figure (bold circled in light purple) in the accompaniment. The

syncopation, unfolding slowly over the plodding repeated f-notes, enhances Stuart's greater use of stillness and space in this variation.

However, it is the new harmonic progression (bold circled in dark teal) that firmly establishes the solemn and plodding character of this variation. A striking feature of this new harmonic progression is its contour. As indicated by the descending blue arrows, Stuart has organised his new harmony into a linear, descending stepwise 'lament bass'. This is a feature that is borrowed directly from the accompaniment of the original theme. Over a iv chord in m. 36, Stuart employs a ritardando (indicated by *rit.*), which is a significant slowing of the tempo, conveying a moment of contemplation.

From previous times, we have come to expect a prominent change whenever Stuart alters the tempo, such as the use of acceleration in m. 16 before a major crescendo, or a long pause in m. 32 during a major change of the key. This time, the rubato signals the end of the lament bass harmonic progression, and hence, the end of a much shorter variation.

A.1.6 Variation Six: New melodic figure (1:59)

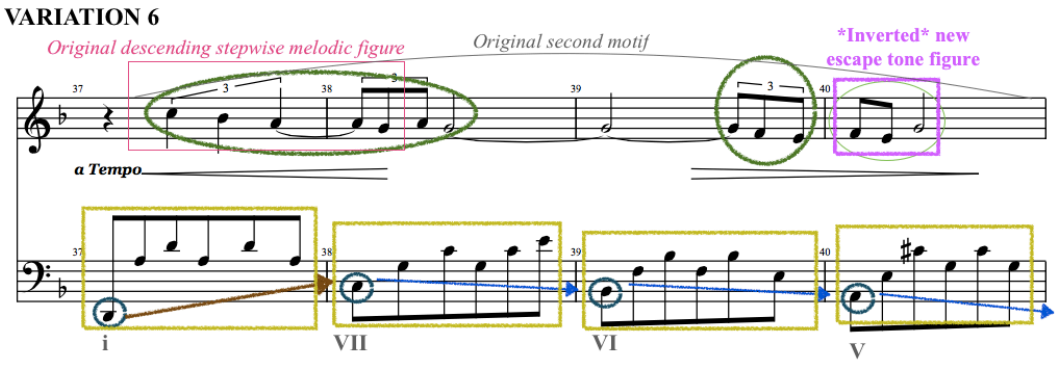


Figure A.13: Musical analysis of variation 6 from Stuart's improvisation

In variation 6, Stuart picks the tempo back up and increases the dynamic level with a crescendo. During this tempo increase, he makes a return of the alberti bass accompaniment (shown in the bold mustard yellow box), providing a sense of forward movement. Additionally, the first note of the alberti bass pattern also served to outline the stepwise descending contour of the 'lament bass' line (indicated by the descending blue arrows).

Over this perpetuating accompaniment cycle, Stuart revisits the structure of the original second motif, with an element borrowed from the fourth motif. In m. 37, he begins with the descending stepwise melodic figure (shown in the dark pink box) borrowed from the fourth motif, which he disguises in his triplet rhythmic figure (bold circled in dark green). Here, one

could argue that the repetition of the a notes and g notes in m. 38, albeit disguised between suspensions and neighbour tones, also outlines properties of the descending repeated note melodic figure from the second motif. As Stuart sustains the g note from mm. 38-39, he effectively doubles the structural length of the second motif. While the second motif was two measures long in the original theme, it has become four measures long in the improvisation until Stuart closes with the short-short-long rhythmic motif (circled in green).

In m. 40, Stuart's escape tone melodic figure from variation 1 reappears (shown in the bold plum box). This time, instead of skipping down a third, the melodic figure has been inverted into ascending up a third interval. At this point, Stuart decreases the dynamic level with a diminuendo, signaling the end of this variation. The length of this variation, like the previous one, is also determined by the length of the 'lament bass' cycle of the new harmonic progression.

A.1.7 Variation Seven: Development of four ideas (2:14)

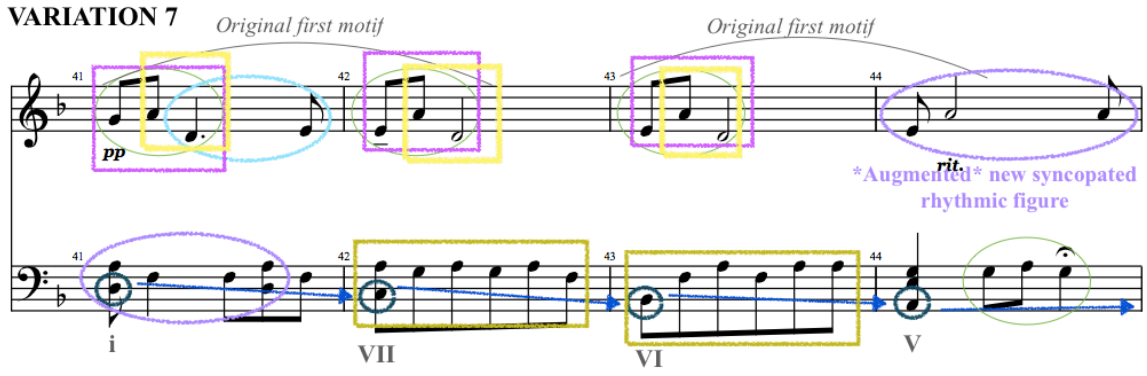


Figure A.14: Musical analysis of variation 7 from Stuart's improvisation.

As Stuart proceeds into variation 7, he drops the dynamic level to a pianissimo (*pp*), making this the quietest moment in the entire improvisation thus far. The melody has also descended to its lowest point: a middle range d on the piano, which becomes a featured note in this variation as Stuart sustains and repeats it over the next two measures.

Compared to the rest of the improvisation, the rhythmic structure of variation 7 is atypically symmetrical in both hands. From mm. 41-42, Stuart's right hand features the short-short-long rhythmic structure of the first motif, and once again from mm. 43-44 (circled in green). In Stuart's left hand, the alberti bass pattern in mm. 42-43 (shown in the bold mustard yellow box) is heard between symmetrical placements of the syncopated rhythmic figure from variation 5. The syncopation rhythm (bold circled in light purple) appears in the

accompaniment at the beginning in m. 41, and it is mirrored again at the end in the right hand at m. 44.

However, Stuart adopts a new approach for the melodic component: he synthesizes two of his melodic figures for the very first time. In m. 41, the three-note melodic figure is actually a fusion of the escape tone figure from variation 1 (shown in the bold plum box), and the descending fifth figure from variation 4 (shown in the bold yellow box). Stuart highlights the significance of this synthesis by repeating the new melodic figure up to three times from mm. 41-43, with the descending fifths reminiscent of a resounding fanfare.

Meanwhile, the descending 'lament bass' line (shown by the blue arrows) continues to support the melodic development as it cycles through the new i-VII-VI-V harmonic progression (bold circled in dark teal). At the end of the phrase, Stuart employs another ritardando (*rit.*) to signify another prominent change for the next variation.

A.1.8 Variation Eight: Development of new triplet motif (2:28)

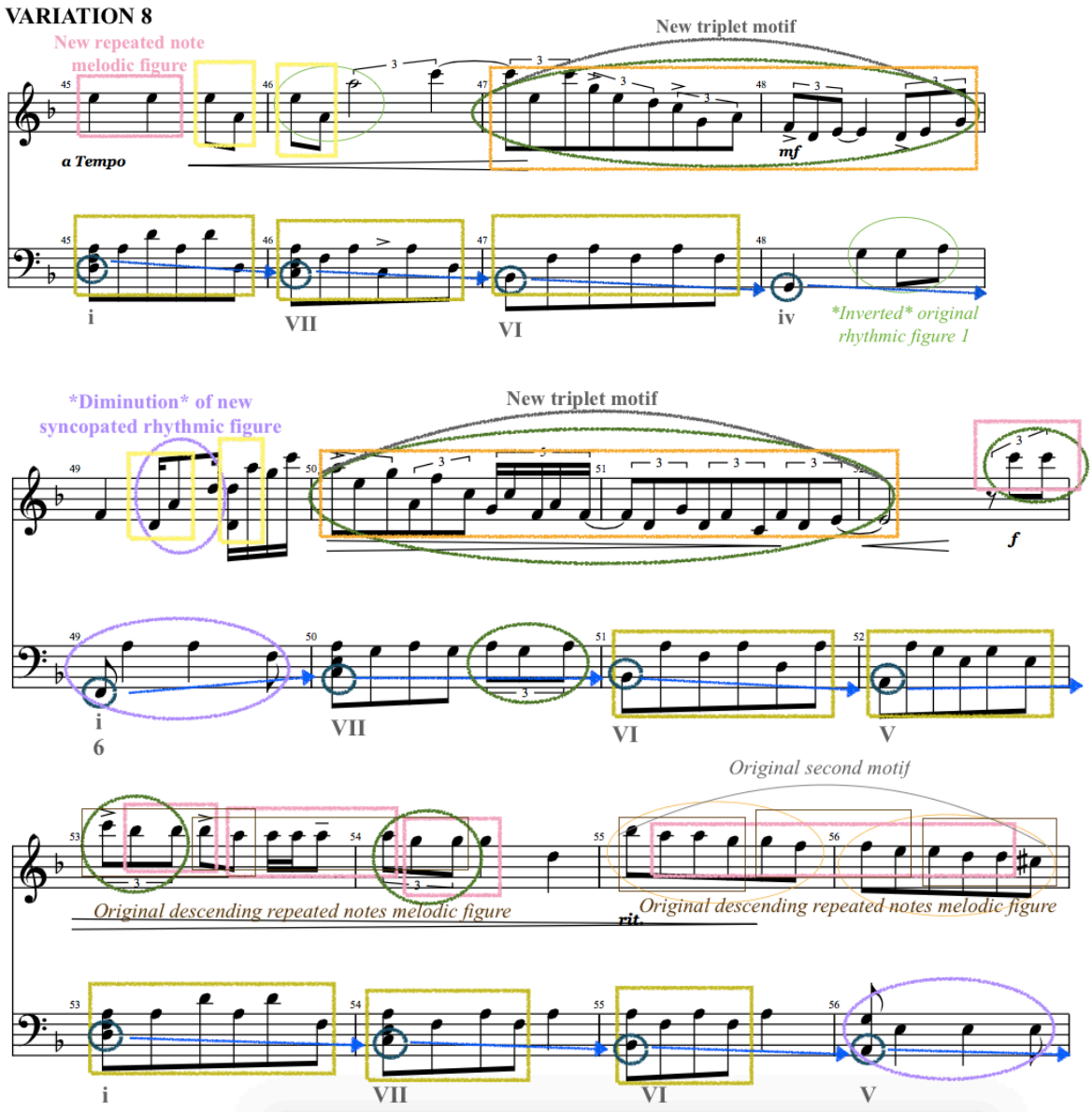


Figure A.15: Musical analysis of variation 8 from Stuart's improvisation.

Variation 8 is the longest variation in Stuart's improvisation. Spanning from mm. 45-57, it features some of the most intensive musical moments during which Stuart develops several of his ideas to their full potential. Restoring back to the original tempo, Stuart comes in on a high e note against the d minor chord in m. 45, creating a jarring dissonance for the first time. This harmonic tension is heightened by his use of the repeated note figure from variation 4 (shown in the bold light pink box), where the high e note comes in two more times, each time coinciding with the clashing d note in the left hand.

The urgency conveyed by the repeated notes figure is strengthened further when Stuart combines it with the descending fifth figure from variation 4 (shown in the bold yellow box).

As a result, we hear a stretto of two voices in mm. 45-46, where the repeated high e notes becomes a merging dialogue with the repeated a notes. As the melody swings back and forth between the high e and a notes, it gathers momentum and leaps up a whole octave to a high a note in m. 46. Stuart continues to stretch the melody to a high c note in m. 47 and sustains it there, emphasizing the highest point it has arrived at since variation 1, although this excludes the two-octave arpeggio embellishment in m. 17.

From mm. 46-48, Stuart employs the triplet rhythmic motif (bold circled in dark green) to extend the high c note into a cascading melodic triplet motif from variation 2 (shown in the bold orange box) and dramatically crescendos from *pp* to *mf*. At this point, the descending 'lament bass' has reached the end of the four-chord harmonic progression, yet the melodic phrase pushes forward to continue with the variation. Indicating no sign of a break, Stuart immediately synthesizes two more of his previous musical figures to produce a new idea.

In m. 49, he combines a diminutive variant of the syncopated rhythmic figure from variation 5 (bold circled in light purple) with the descending fifth melodic figure from variation 4, which has been inverted into an ascending fifth (shown in the bold yellow box). At the same time, the syncopated rhythm is mirrored in the left hand accompaniment, while the inverted melodic fifth figure is emphasized again in the right hand with a d octave. Climbing back to the high c note in m. 49, Stuart breaks out again into the melodic triplet motif from mm. 50-51, inserting a quintuplet of semiquavers in the midst of the cascading triplet notes.

Having arrived to the end of another i-VII-VI-V harmonic cycle, Stuart nevertheless continues the variation into its third harmonic round. After a crescendo to *f* in m. 52, he produces again a new synthesis of ideas from mm. 52-54, although it initially appears as a variant of the cascading triplet motif. Rather, Stuart has combined the triplet rhythmic figure (bold circled in green) with the repeated note melodic figure (shown in the bold light pink box) and the descending repeated notes melodic figure from the second motif (shown in the brown box).

By m. 55, the triplet rhythm temporarily ceases, as the repeated notes figure (shown in the bold light pink box) becomes a foregrounded feature in the descending melodic line. The melody continues to descend into a diminuendo, while also highlighting the structure of the second motif from mm. 56-57. For the first time, the ascending repeated notes melodic figure from the second motif (shown in the brown boxes) is fully featured with its original rhythmic figure counterpart (circled in orange).

Meanwhile, the descending ‘lament bass’ has completed the harmonic cycle for the third time. At m. 56, the perpetuating motion of the alberti bass accompaniment (shown in the bold mustard yellow box) comes to a temporary halt with the syncopated rhythm from variation 5 (bold circled in light purple), indicating the end of a long variation.

With the dynamic level lowered to a subdued *mp*, Stuart finally closes variation 8 with a ritardando from mm. 56-57, marking the end of an extensive B Section of the improvisation. Amidst the slowing tempo, the repetition of a c sharp note over a V chord prepares our ears for another major key change for the next variation.

A.1.9 Variation Nine: Modulation into D major (3:13)

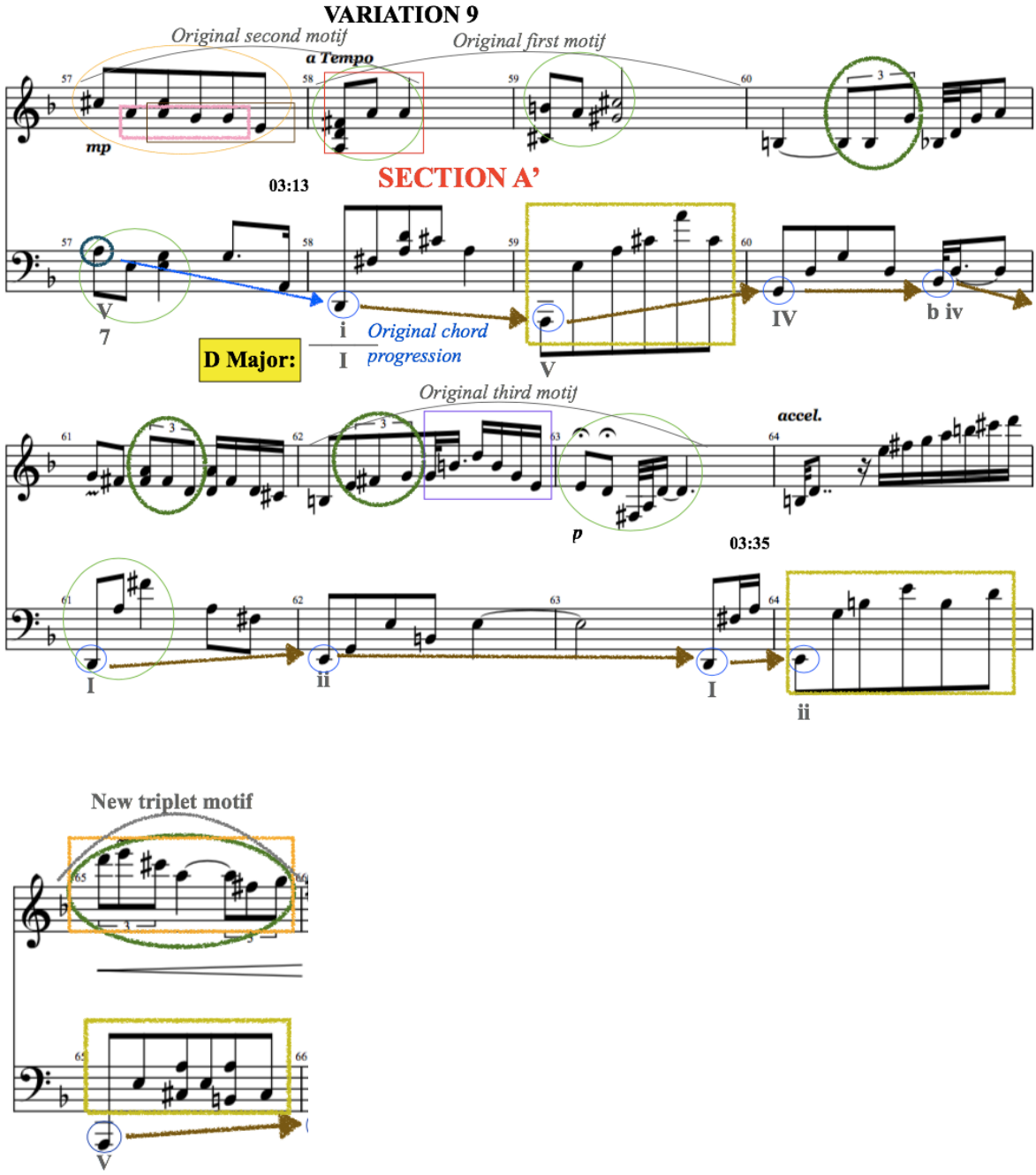


Figure A.16: Musical analysis of variation 9 from Stuart's improvisation.

In m. 58, Stuart picks up the tempo and opens variation 9 in D major, with a bold restatement of the elements from the first motif in their entirety (shown in a red box and green circle). The harmony has also shifted back to the original chord progression (circled in blue) of I-V-IV-b iv-I-ii-V-I, restoring the eight measure length of the original theme, and signifying the return of an altered A' Section.

In this variation, the harmonic movement has ceased as a descending 'lament bass' and is replaced again by the waltz-like accompaniment from variation 1, resulting in an angular harmonic contour (indicated by the brown arrows). In contrast to the strict descending bass line in the B Section, this accompaniment style provides more flexibility with rhythmic variations across a wider range on the piano. This is illustrated by the way Stuart alternates between variances of the alberti bass sequence (shown in a bold mustard yellow box), and the short-short-long rhythmic figure (circled in green).

Having restored the aural blueprint of the original theme, Stuart proceeds to embellish the melody with his triplet rhythmic figure (bold circled in dark green) from mm. 60-62. When he returns to the structure of the third motif in m. 62 (shown in the purple box and green circle), he makes an unexpected pause at the end of the phrase in m 63, indicated by two fermatas over the notes e and a. As the accompaniment arrives to the ii and V chords in mm. 64-65, an ascending melodic scale suddenly appears in an accelerated tempo. Within one measure, the melodic scale climbs up a whole octave and breaks into the triplet motif in m. 65 (shown in the bold orange box and bold dark green circle).

Meanwhile, Stuart makes the accompaniment crescendo dramatically from a *mp* to *f* to heighten the tension of the harmonic progression. In so doing, our ears begin to anticipate a strong statement of the I chord as Stuart's improvisation heads towards the next variation in full swing.

A.1.10 Variation Ten: Reappearance of seven ideas (3:41)

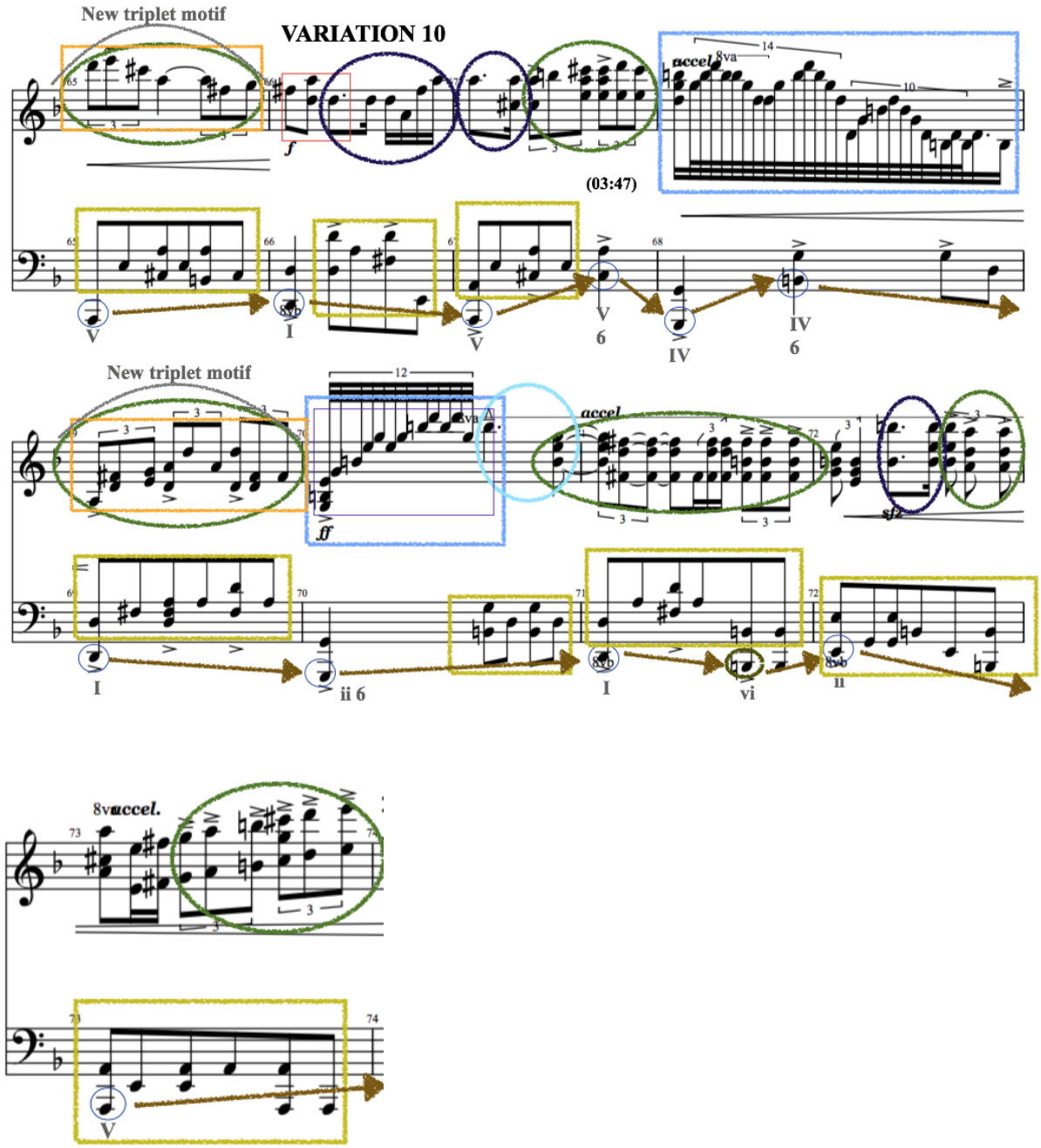


Figure A.17: Musical analysis of variation 10 from Stuart's improvisation.

Variation 10 features a most dramatic change of musical character that we have encountered thus far in Stuart's improvisation. It opens in m. 66 with a strong announcement of the ascending repeated note melodic figure from the first motif (shown in the red box). Assertively extending the phrase into m. 67, Stuart alternates between the triplet rhythm (bold circled in dark green) and a march-like rhythmic figure from variation 3: a dotted eighth note followed by a group of five semiquavers (bold circled in dark purple).

The accompaniment throughout this time has developed into a heavily accented alberti bass that is embellished with chords and octaves, akin to a musical rocking style from the rock genre. In m. 68, Stuart launches into a sweeping two-octave arpeggio embellishment figure from variation 3 (shown in the bold light blue box) with a large crescendo. This leads into the melodic triplet motif in m. 69 (shown in the bold orange box), where Stuart resolutely accents on all the down beats.

The crescendo continues to build through the rhythmic intensity generated by the repeating triplets (bold circled in dark green) and finally culminates in m. 70 on an ii chord played in double *ff*. Propelled by the new dynamic level, the melody ascends rapidly into another arpeggio figure that partly features the melodic arc figure from the third motif (shown in the dark purple box). The arpeggio ends with a longer dotted rhythmic figure from variation 3 (bold circled in bright turquoise), providing a temporary respite.

As the harmonic progression reaches the end of its cycle, Stuart once again accelerates the tempo from mm. 71-73, building momentum through accented chords alternating between triplets (bold circled in dark green) and the dotted march rhythm (bold circled in dark purple). Like the last variation, Stuart ends this one with an ascending melodic scale in m. 73, this time with a sequence of consecutively accented blocked chords surging into a crescendo.

A.1.11 Variation Eleven: Development of new triplet motif (4:04)

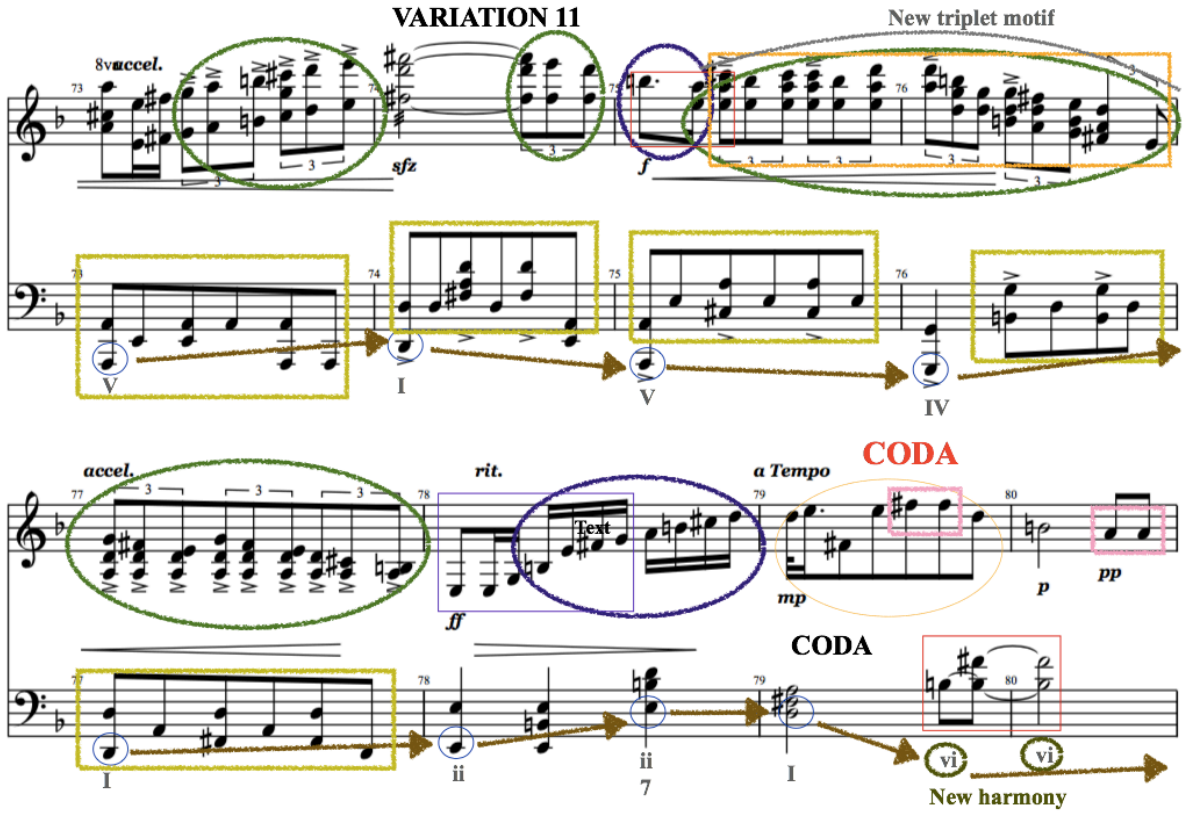


Figure A.18: Musical analysis of variation 11 from Stuart's improvisation.

In the last variation, Stuart begins the development of the climax for his improvisation. Variation 11 starts at m. 74 with a sudden and strong high f sharp chord (played in *sfz or sforzando*), which Stuart sustains with a loud tremolo for at least two beats before resolving into a dotted march rhythm (bold circled in dark purple) from variation 3.

For most of this variation, Stuart has departed completely from the motivic structures of the original theme. Besides one element borrowed from the third motif, he has retained only the original harmonic progression (circled in blue), which continues as a heavily accented alberti bass (shown in the bold mustard yellow box). In m. 75, the melody falls rapidly into a steep decent spanning over two octaves and three measures. Here, the cascading triplet motif (shown in the bold orange box and bold dark green circle) effectively outlines the triad notes of the G major IV chord, like it had previously done in variation 2.

From mm. 75-78, Stuart drives relentlessly through heavily accented full chords to accelerate the tempo one last time through the triplet rhythm (bold circled in dark green). Building up the intensity, the improvisation finally reaches its climax at m. 78, where the alberti bass accompaniment halts abruptly.

Through the surge of a final wide crescendo in m. 77, the energy of the triplet chords converge into a powerful single note at m. 78 – an 'E' resounding at a double fortissimo (*ff*) from the lower middle range of the piano. This climax note is heightened by the ii chord that appears as a pure octave underneath it, doubling the effect of the single E note sound.

Following the two-octave melodic decent, Stuart places a *ritardando* on the tempo to let the melody settle in the lowest point it has traveled to in the entire improvisation. Following the climax, the e note rises gently into a small arpeggio, briefly outlining the melodic arc from the third motif (shown in the purple box). With a *diminuendo*, the melody continues to ascend slowly through a group of semiquavers, which comprised part of the dotted march rhythm in variation 3 (bold circled in dark purple). The *ritardando* continues and the ii chord remains sustained until the end of m. 78, marking the end of the last variation in the altered A' Section.

A.1.12 Coda: Original materials from "Answer Me" (4:19)

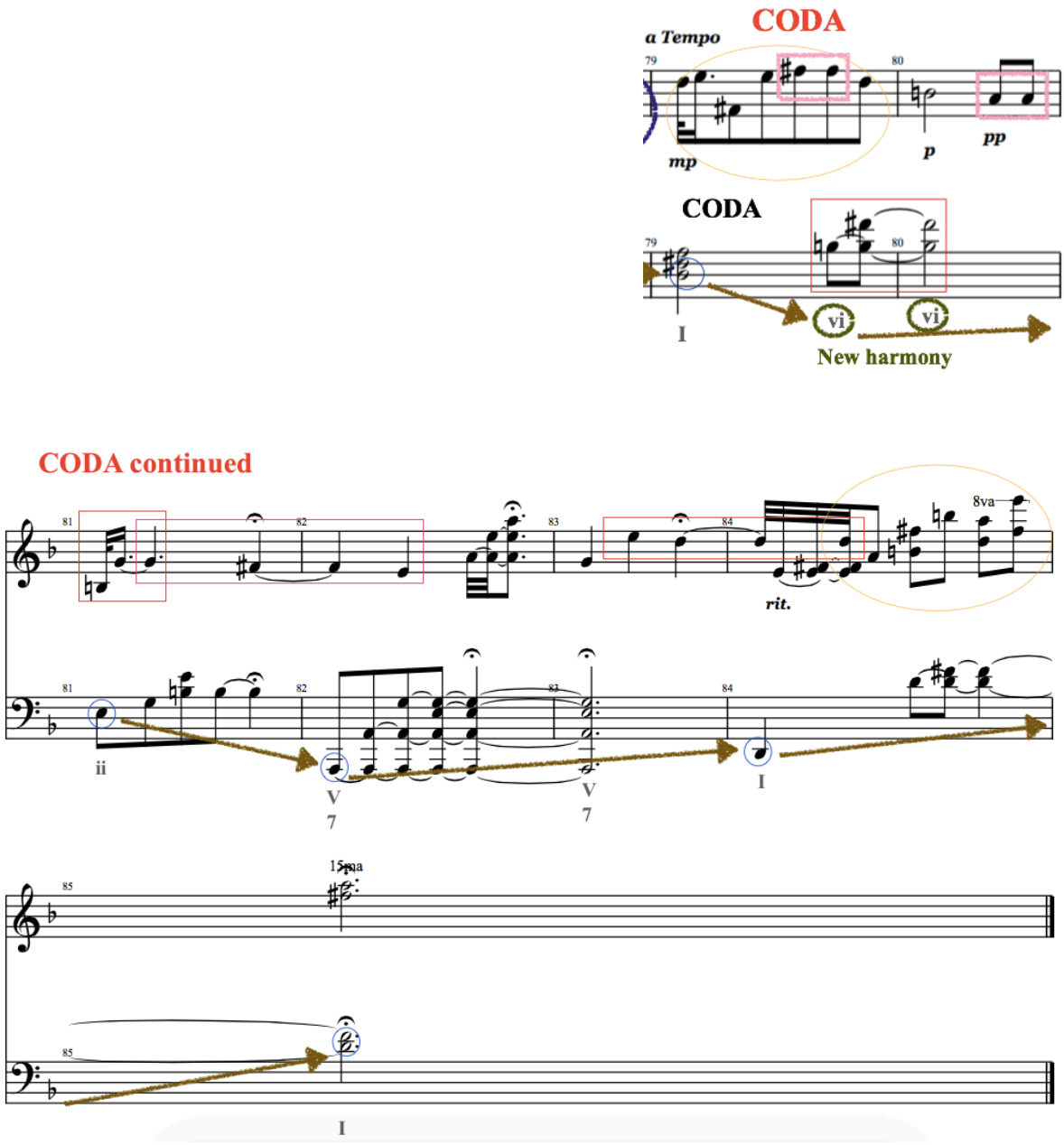


Figure A.19: Musical analysis of the coda from Stuart's improvisation.

The Coda Section begins at m. 79, where the harmony has resolved from ii into an I chord. Returning to the higher register of the piano, Stuart brings the melody down to a whisper at *pp*, while incorporating the original eighth note rhythmic figure from the second and third motifs (circled in orange). The original harmonic progression is temporarily disrupted by a vi chord (bold circled in olive), where Stuart refers briefly to his repeated note figure (shown in the bold light pink box) from mm. 79-80.

Although the improvisation continues in the original tempo, the sparse accompaniment and the static melodic contour create a feeling of stillness. From mm. 81-85, a sense of expansive space is instilled by the slowing tempo, and a progression of single notes that move slowly in large intervallic leaps, each of them ringing from the sustaining pedal.

In the final measures, Stuart makes a last reference to the ascending repeated figure from the first motif (shown in the red box) and the descending stepwise figure from the fourth motif (shown in the pink box). As the low d note from the I chord rings out a harmonic final resolution in m. 84, Stuart lifts his melody to the highest register of the piano, closing his improvisation with the rhythmic figure from motifs 2 and 3 (circled in orange).

In summary, this section has introduced and presented the eleven variations and coda from Stuart's first improvisation on 'Answer Me'. In particular, at least four new rhythmic figures, six new melodic figures, and two new harmonic figures appeared in Stuart's improvisation, which were not found in 'Answer Me'. A number of Stuart's new melodic figures, such as the triplet motif, appeared and was developed further at several climatic points in his improvisation.

A.2 Ron's improvisation: Fantasia with recitative and aria

This section presents Ron's improvisation on the given musical stimulus, "Answer Me" (see Section 4.4 for the musical analysis of the stimulus). Performed at a larghetto tempo, the entire improvisation is in D-flat major like the original musical stimulus, and lasts two minutes and thirty-three seconds. Ron's improvisation performance was recorded and transcribed into thirty-four measures. A musical analysis of the transcription revealed a free musical form similar to a fantasia with several different episodes. The improvisation opens with a recitative introducing the entire theme (e.g. melody of "Answer Me") in a slow tempo with shifting meters. The recitative then leads into an aria in simple binary form in regular duple meter. A reprise of the recitative follows the aria bringing the improvisation to a climax, and concludes with a coda. Each musical episode is presented in detail in the following subsections.

A.2.1 Introductory recitative: changing meter and new harmony (0:00)

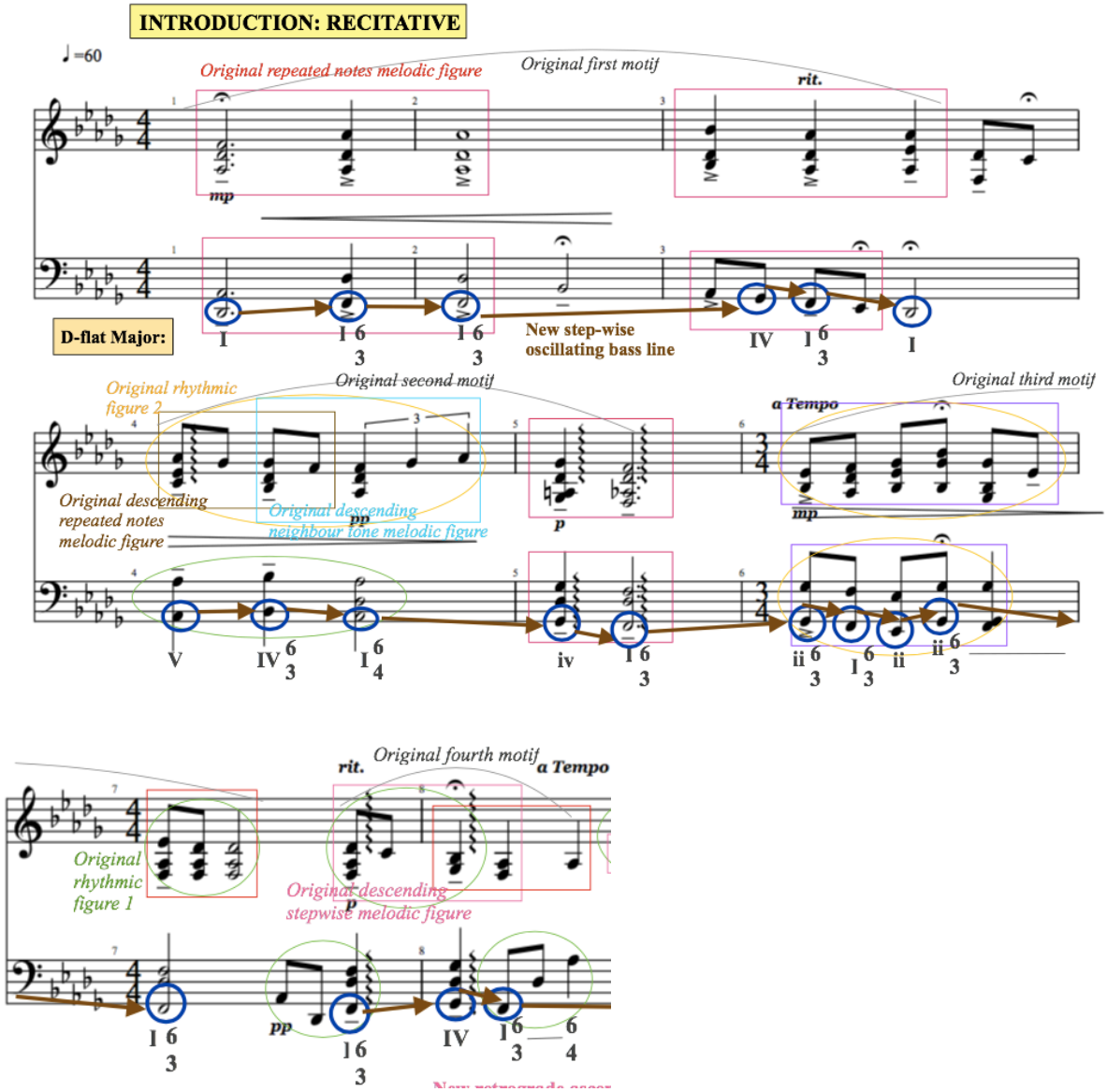


Figure A.20: Musical analysis of the recitative from Ron's improvisation

Ron begins his improvisation by introducing the original melody of "Answer Me" in a slow tempo. Starting in the middle range of the piano, the melody is accompanied mostly by chords that move with it in a parallel rhythm, giving this section a homophonic texture.

Within the introductory recitative, nearly all of the original melody is present. In the musical analysis, thin coloured boxes mark the original melodic figures from "Answer Me", and the thin coloured circles mark the original rhythmic figures. All of the four motifs and its melodic and rhythmic figures appear in the original order, with the exception of rhythmic figure 1 (marked with a green circle) which appears only in measure 7 instead of measure 1.

Bolder lines mark the new components that have been introduced into the improvisation by Ron. For instance, the most noticeable difference is the introduction of a new I 6/5 – IV – ii – I 6/5 harmonic progression, indicated by a bold dark blue circle and brown arrows. A feature of this progression is its tendency to oscillate between the IV and I 6/5 chords. Over the next seven measures this new harmonic progression also incorporates several other chords including a minor iv, I 6/4 and V, but a resolution to the tonic chord does not appear.

The melody is also presented in what is perceived to be 4/4 meter. However, the frequent occurrences of *fermatas*, *ritardando*, and *a tempo* make the pulses irregular, which gives the melody its speech-imitating quality reminiscent of a recitative. In measure 6, the original third motif is presented briefly in 3/4 meter before switching back to 4/4 meter.

Ron also makes liberal use of the pedal, different articulations, rolled chords, and dynamic swells to enhance the expressiveness of the melody. The varying tempo, the ringing homophonic texture from the lower-range chordal accompaniment, and the unresolved harmonic progression creates a solemn and contemplative mood.

Although Ron has presented the entire melody in the same key with nearly all of its components, he is flexible in the way he introduces each motif. By varying the phrase lengths (e.g. extending the first motif one measure longer) and redistributing the downbeats (e.g. entering the fourth motif earlier in mm. 7), he creates a significant contrast in the musical character from the original version.

A.2.2 Aria (A): Development of fourth motif (0:45)

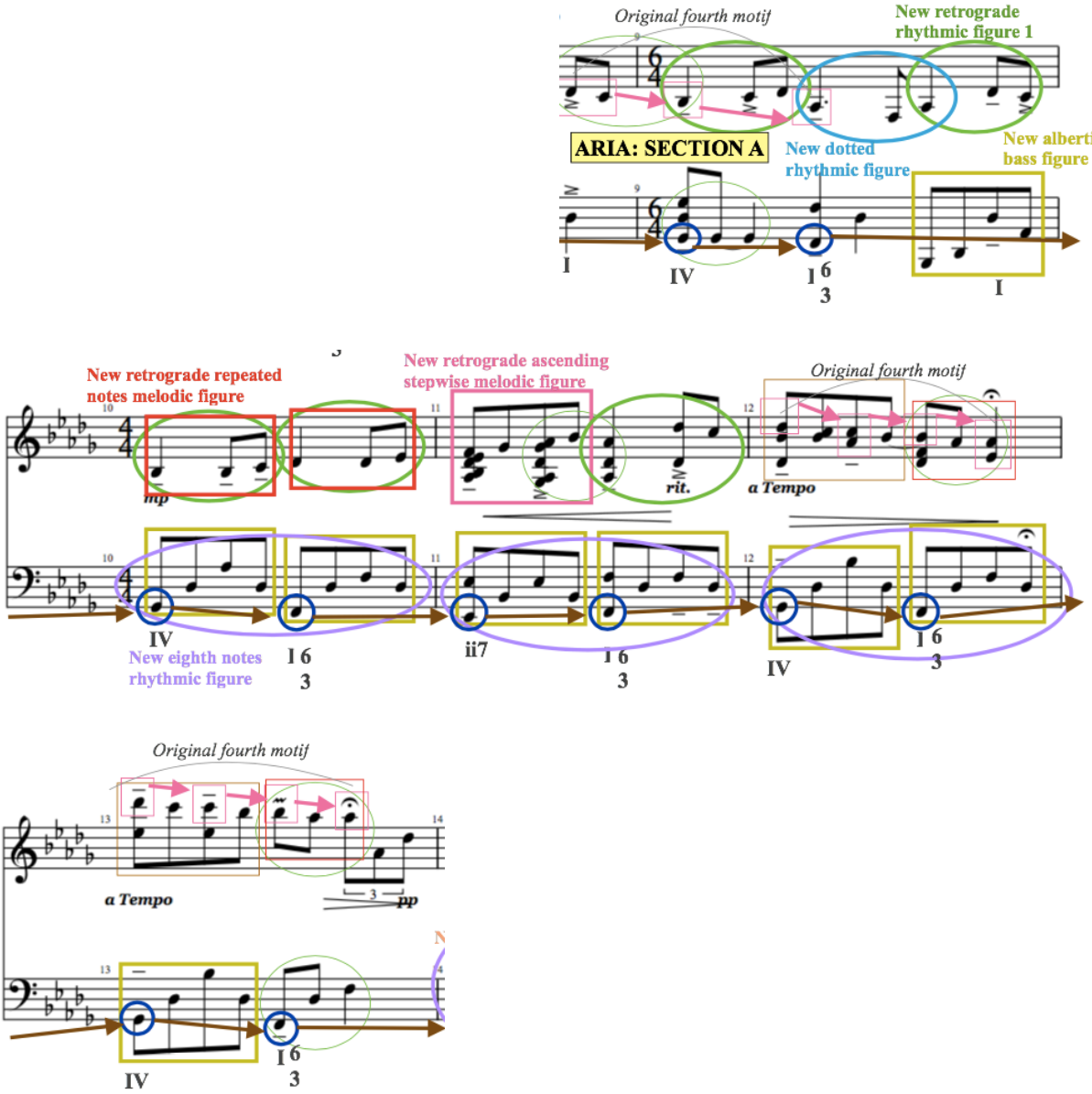


Figure A.21: Musical analysis of the Aria (A) from Ron's improvisation

Following the statement of the melody in the previous Section, Ron's improvisation leads into the first part of the aria in simple binary form. In contrast to the recitative, the aria gradually establishes a regular pulse in 4/4 meter starting in measure 10. The aria contains a solo lyrical melody that features the fourth motif from the original stimulus. In particular, the fourth motif appears three times and is often presented as an augmentation from the original version. Small pink squares and pink bold arrows in measures 9, 12, and 13 mark the stepwise descending melodic figure from the fourth motif.

In measures 9 to 12, bold coloured circles in green, teal, and purple mark three new rhythmic figures. The first rhythmic figure, in green, is actually the original rhythmic figure 1 presented

in retrograde form. In this musical analysis, new figures that bear a strong resemblance to the original stimulus are marked with the same colour (see Section 4.4), but with bolder lines. In measure 9, a new dotted rhythmic figure, marked with teal, also appears once but will resurface again later in the improvisation. The most noticeable rhythmic change occurs in measure 10 where Ron introduces a sequence of running eighth notes, marked with purple, in the accompaniment. This change to the harmonic accompaniment creates a sense of forward motion and a less homophonic texture compared to the previous chordal accompaniment in the recitative.

Three new melodic figures, marked by gold, red, and pink bold squares, also appear in the aria. The gold melodic figure features an alberti bass that is used as an accompaniment for the lyrical melody. However like the first rhythmic figure, the red (m. 10) and the pink (m. 11) melodic figures bear a strong resemblance to the original stimulus. Specifically, the red melodic figure is a retrograde of the original repeated notes melodic figure. Meanwhile, the pink melodic figure is also another retrograde, showing an ascending stepwise melodic figure in contrast to the original descending stepwise figure.

The new harmonic progression of I 6/5 – IV – ii – I 6/5 introduced from the recitative is highlighted in the bass line of the accompaniment. Apart from the ii7 chord that appears once in measure 11, the rest of the harmony oscillates between the IV and I 6/5 chords, creating a sense of forward motion and unresolved harmonic tension. The first aria closes with an echo of the fourth motif in an upper register of the piano, with the last note of the melodic figure suspended by a fermata in measure 13.

As such, a more regular pulse, a new accompaniment style and texture, and a further development of the original fourth motif characterise the first aria. Five new melodic and rhythmic figures appear in this aria, where three of the figures are presented as retrogrades of the original stimulus.

A.2.3 Aria (B): Development of second motif (1:13)

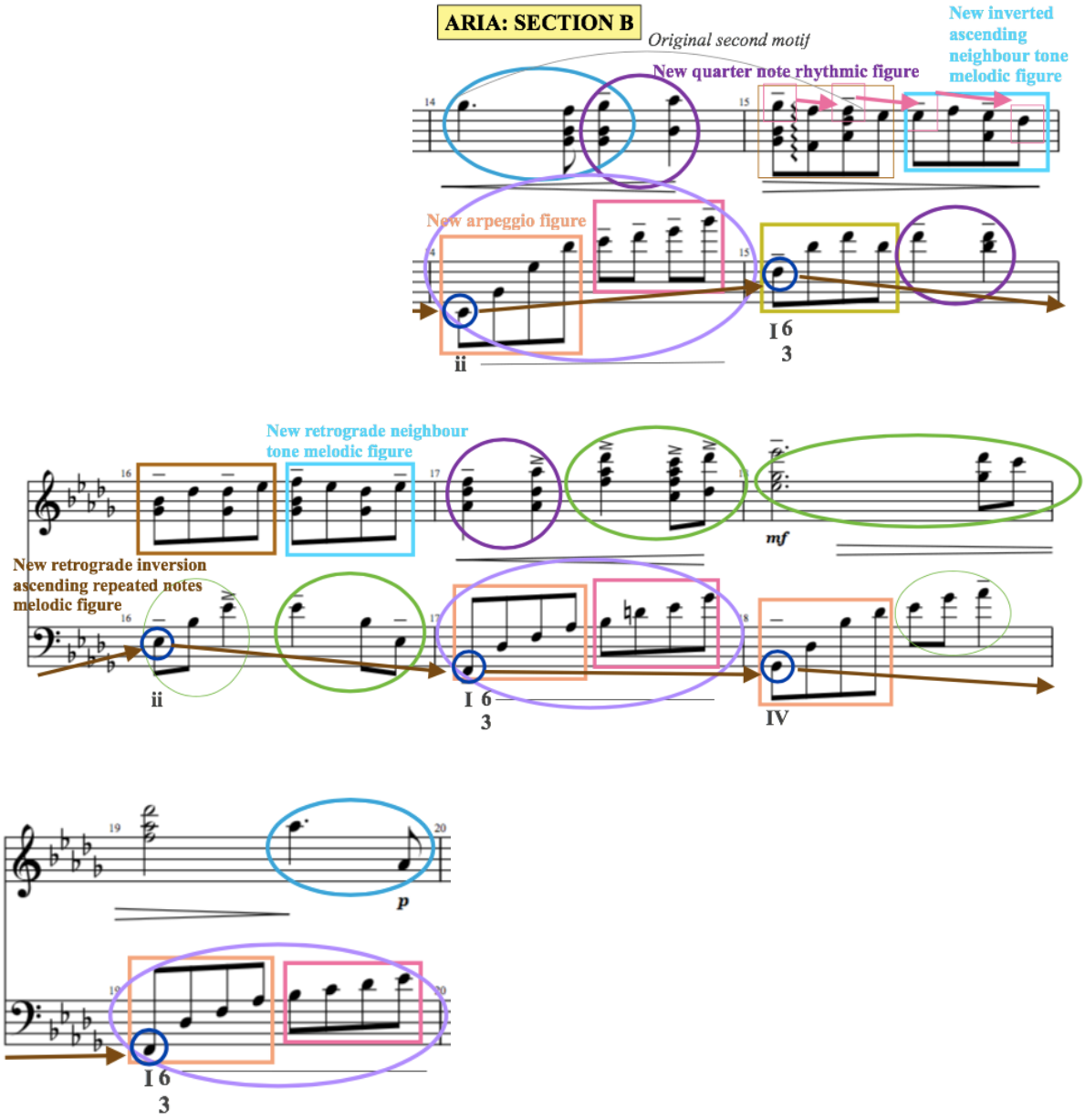


Figure A.22: Musical analysis of the Aria (B) from Ron's improvisation

After the developing the fourth motif, Ron's improvisation introduces a second aria that features a new lyrical melody singing more than an octave higher. By this point, the pulse and meter have become regular and there is no use of *fermatas* or noticeable fluctuations to the tempo.

In the second aria, Ron turns to explore the second motif from the original stimulus. In measures 14 and 15, he re-presents the melodic pitches from the second motif (Gb-F-Gb-Ab-Gb-F-F) in two new rhythmic figures and one melodic figure. The bold teal circle marks the dotted rhythmic figure that had appeared earlier in measure 9. Immediately next to it a bold

magenta circle marks a new rhythmic figure comprising two quarter notes. Then, the second motif ends with a quotation of the original descending repeated notes figure, as shown in a thin brown square.

In the second half of measure 15, a bold turquoise box marks a new melodic figure, which is an inversion of the original ascending neighbor tone figure from the second motif. The turquoise neighbor tone figure appears again in measure 16, this time in retrograde form. Measure 16 also contains a bold brown box highlighting an ascending, retrograde inversion of the original descending repeated notes figure. When measures 15 and 16 are viewed together, the melody in measure 16 appears as a rough inversion of the melody in measure 15. In measure 15 a series of small pink squares and arrows also highlight the echo of the stepwise descending figure from the fourth motif.

In the second aria, Ron changes the texture of the accompaniment again. In measure 14, a bold orange box marks a new arpeggio figure. Ron creates the new accompaniment by combining the orange arpeggio figure with the pink melodic retrograde and the purple eight-note rhythmic figure, which are both from the first aria. With a series of eight-note rhythms spanning over more than two octaves, this new accompaniment figure widens the range of the sound, introducing a feeling of expansion to the improvisation. In the second aria, Ron alternates between using this expansive accompaniment figure with quotations of the alberti bass figure (gold box), the two quarter notes figure (magenta), and a retrograde of rhythmic figure 1 (green cirle). Although the harmony of the second aria remains the same as the previous Sections, the new accompaniment figure breaks up the stepwise pattern of the bass line from the first aria, resulting in a more angular accompaniment texture.

By the end of the second aria, Ron has already created and introduced all of the new melodic and rhythmic figures for his improvisation. At this point he has also started to combine new ideas from previous Sections to create new patterns and textures in the melody and the accompaniment.

A.2.4 Reprisal of Recitative: Restatement of theme over walking bass (1:37)

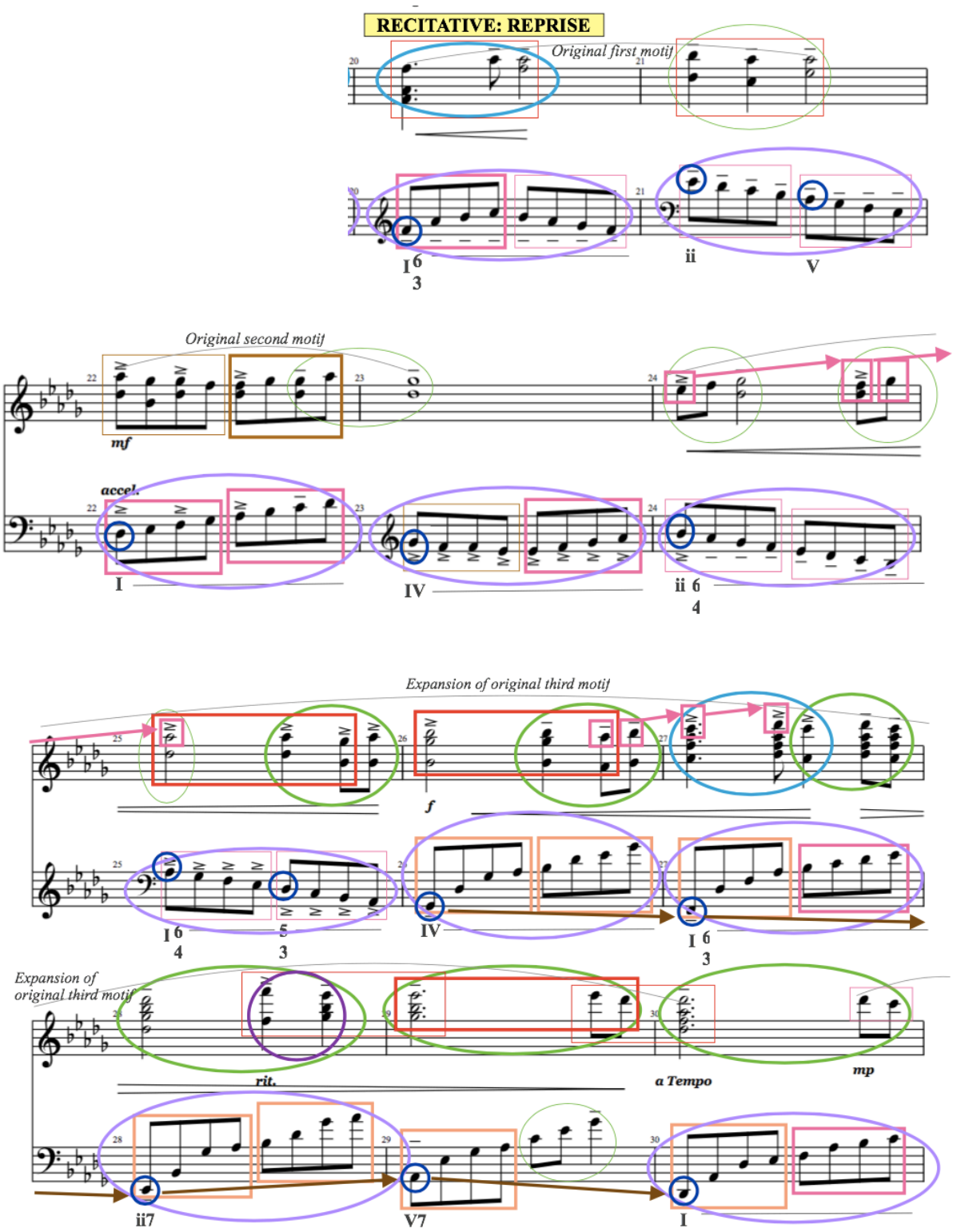


Figure A.23: Musical analysis of the Reprise from Ron's improvisation

After exploring the fourth and second motifs in the previous two arias, Ron brings back a reprise of the recitative. Unlike the previous Sections, the tempo of the reprise accelerates significantly at measure 22. The dynamic level also increases dramatically, reaching the loudest point in the improvisation from measures 26 to 28. The reprise, which is the longest Section and contains two climaxes in Ron's improvisation, restates almost the entire original melody from the stimulus an octave higher. The first climax occurs in measures 21 to 22, where the harmony finally resolves to the tonic chord for the very first time through a ii-V-I harmonic progression. Following the buildup of a seven-measure phrase a second climax occurs again in measures 28 to 30, which features the highest note in the improvisation (e.g. a high 'F' in mm. 28) and another appearance and resolution of the ii-V7-I chord progression.

The reprise also features all of the melodic and rhythmic figures that had been created in the previous Sections, except for the alberti bass figure (gold) and the retrograde inversion neighbor tone figure (turquoise) from the two arias. Many of these new figures appear in measure 24, where Ron explores the third motif further for the first time. In measure 24, he develops the third motif by lengthening it into seven measures long. Within these measures, Ron expands the range of melody to over an octave by reincorporating quotations of the retrograde repeated note figure (red box), the retrograde of rhythmic figure one (green circle), the dotted rhythm figure (teal circle), and the two quarter note figure (magenta circle).

Like the previous Sections, Ron also changes the accompaniment in the reprise. In addition to resolving the harmony twice in measures 22 and 30, he introduces a walking bass line in measure 20. An examination of the walking bass line shows that it comprises several new and original figures from the previous Sections: a quotation of the original descending stepwise figure from the fourth motif (thin pink box), a ascending retrograde of the stepwise figure (bold pink box), and the eight-note rhythmic figure (purple circle). The stepwise accompaniment adds a contrapuntal layer to the sound texture, which has been generally homophonic up until this point. In measure 23, the accompaniment briefly becomes a 'call-and-response to the melody in measure 22, responding with a quotation of the same descending repeated note figure (thin brown box).

Of all the Sections, the reprise features the most dramatic changes in Ron's improvisation. In particular, the harmonic resolution, the tempo acceleration, and the introduction of a contrapuntal layer in the accompaniment create a new intensity and character that is dramatically different from the version in the recitative.

A.2.5 Coda: Echoes of fourth and second motifs (2:12)

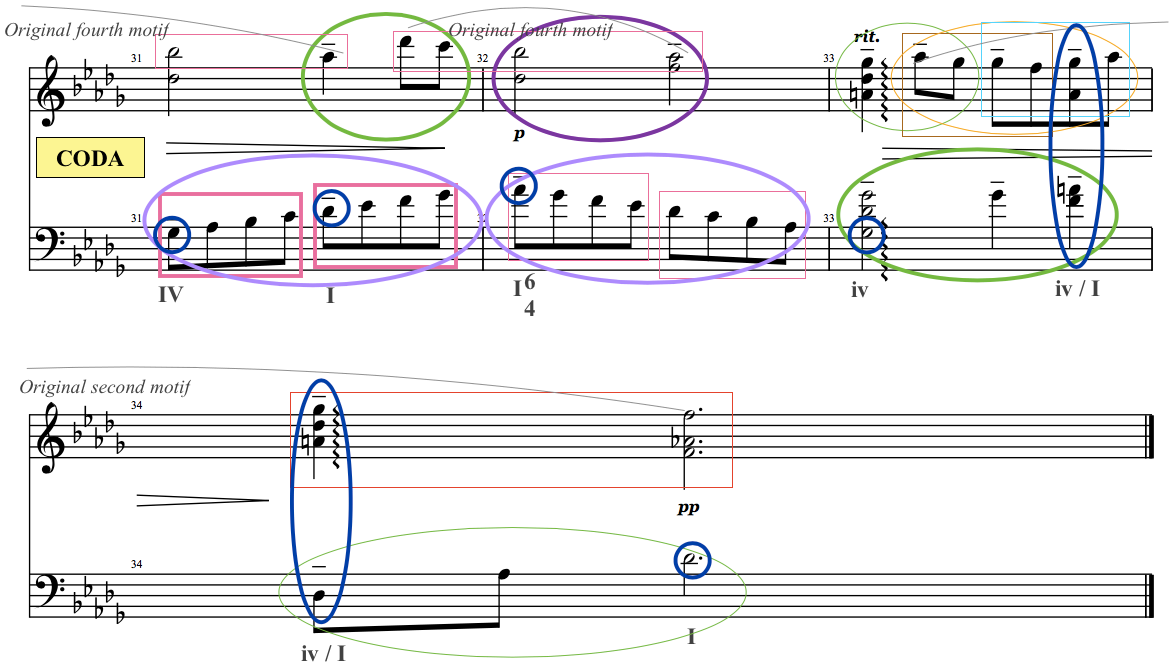


Figure A.24: Musical analysis of the Coda from Ron's improvisation

The coda, which starts at measure 30, marks the end of Ron's improvisation. This section features both a lyrical melody and an accompaniment at the higher range of the piano. As the quietest part of the improvisation, the peaceful and gentle mood of the coda is conveyed by a gradual slowing of the tempo and the reappearance of rolled chords.

The melody in the coda is split into two parts: part one comprises a quotation of the fourth motif, and part two also quotes the second motif. In measures 30 to 32, Ron repeats the descending stepwise figure from the fourth motif (thin pink boxes), and incorporates a retrograde of rhythmic figure 1 (green circle) and an augmentation of the quarter note rhythmic figure (magenta circle). In measure 33 and 34, Ron brings back an almost exact quotation of the second motif including nearly all of the original rhythmic and melodic figures.

Similar to the melody, the accompaniment is also split into two parts: part one features a contrapuntal texture to the melody, and part two features a homophonic texture. In measures 30 to 32, the stepwise walking bass line accompanies the repeated fourth motifs. By measure 33, the accompaniment switches back to the blocked chords that were first heard in the recitative.

The most noticeable feature of the coda is the reappearance of the minor iv chord in measures 33 and 34 (dark blue circle), marking only the second time it has appeared in Ron's

improvisation. Ron inserts the minor iv chord under the quotation of the second motif, which is consistent with how it had appeared earlier in the recitative (measure 5) and in the original stimulus.

The coda can be considered as a reiteration of the main ideas from the original stimulus that Ron had chosen to focus on in his improvisation: the second motif and the fourth motif.

To summarise, Ron's improvisation can be described as a fantasia form that comprised five Sections. Ron transformed the original melody of the stimulus into a new mood and character by changing the time signature and varying the tempo. Each Section also featured a new prominent idea or a change in musical texture. In particular, the two arias in Ron's improvisation featured the fourth and the second motifs respectively. In addition to introducing two new rhythmic figures and two new melodic figures, Ron re-presented original rhythmic and melodic figures in retrograde or inversion form and combined them to form new ideas and textures.

Appendix B: Example of drawing analysis (second level)

Stuart's Improvisation on the Musical Stimulus:

Types of Reflection-Based Mental Representations and Constructed Meanings

Variations	Meanings constructed		Evidence in the data	Type of Reflection MR
1	C a u s a l	Corporeal	"I tend to close my eyes…even notes…can be a distraction…you're looking rather than feeling what's happening."	Self-based
		Referential (Intra)	"a box you were given…use that to start" "arrow to say…bit of variation in bass" Repetition: box from drawing of stimulus	Performance: structure Performance: possibility Performance: expectation
		Referential (Extra)	"express tenderness"	Performance: narrative
		Collaborative	"communicate with the person and audience"	Social-based
		Representational	New bass contour, similar melody and harmony	Performance: poss/inter
2	C a u s a l	Referential (Intra)	"slight variation", repetition: box, arrow	Performance: structure
		Collaborative	"trying to say"	Social-based
		Referential (Extra)	"what we all feel…we can admit it"	Performance: narrative
		Representational	New motifs: m. 10, 11, 14-16 (*triplets)	Performance: poss/inter
3	C a u s a l	Referential (Intra)	"a bit deeper", repetition: arrow, stars, checks	Performance: structure
		Corporeal	"into just thoughts here", "pattern of thought"	Self-based
		Referential (Extra)	"romantic, love, beauty, light, nothing hanging" "I can do this, I can do it!"	Performance: narrative
		Causal	"gives you more impetus to do…deep chordal"	Performance: expectation
		Representational	New motifs: m. 17, 18, 27; louder, thick texture	Performance: poss/inter

4	Causal	Referential (Intra)	“down to a deeper level”, “another level of depth”, repetition: arrow	Performance: structure
		Referential (Extra)	sad face	Performance: narrative
		Collaborative	“I’m trying to say something”	Social-based
		Corporeal	“I purposely made myself think of something that made me feel emotional…you start changing your whole body language”	Self-based
		Representational	New motifs: m. 28-29; D minor; softer; lower	Performance: poss/inter
5 to 7	Causal	Referential (Intra)	Repetition: tears	Performance: structure
		Referential (Extra)	“a couple of tears”	Performance: narrative
		Collaborative	“wanting to reiterate, trying to talk, to express”	Social-based
		Causal	“there, it’s a bit slower”	Performance: expectat.
		Representational	Repetition of motifs: m. 33-35, 27-29, 41-43;	Performance: poss/inter
8 (part 1)	Causal	Referential (Intra)	Repetition and development: white box to black	Performance: structure
		Referential (Extra)	Black box; “anxiety, blackness”, “hardly able to drag yourself off the floor, “spiral down”	Performance: narrative
		Representational	New motif: m. 45, 47; dissonance; louder, descending melody and bass, (*triplets)	Performance: possibility Performance: Interven.
8 (part 2)	Causal	Referential (Intra)	Repetition: black box, size increase	Performance: structure
		Referential (Extra)	“darker and thinking: I can’t sustain this”, “still thinking of the romance”, “hope”	Performance: narrative
		Collaborative	“trying to tell that person”, “want you to hear”	Social-based
		Corporeal	m. 49-54: “Sometimes, I just think I'll have a frivolous moment and try anything just to enjoy myself.” “That bit that went kind of a bit flippant, I	Self-based Performance: surprises

			wasn't really expecting it."	
		Representational	New motif: m. 49-51, dissonance; louder; angular melody & rhythm; accents, (*triplets)	Performance: possibility Performance: Interven.
9	Causal	Referential (Extra)	"regaining strength", "that positive kicked in…it's alright, I can do this"	Performance: narrative
		Corporeal	"when I've improvised a motif, even though it's only a few notes, it's stuck in my head, so then I will keep coming back to it"	Performance: structure Performance: expectat.
		Representational	m. 58: return of original motif, texture, harmony, key, dynamics similar to var. 1; D major	Performance: musical possibilities & interven.
10 and 11	Causal	Referential (Intra)	Repetition and development: walking up steps	Performance: structure
		Referential (Extra)	"I can fight this…I fight what happens"	Performance: narrative
		Collaborative	"keep the communication interesting, because if you think you're losing the person you're communicating with..."	Social-based
		Corporeal	"That's the mixture of thinking: let's have a contrast …well, let's change the course of this. And then thinking: back to the emotion"	Self-based Performance: possibility Performance: interven.
		Causal	"So there's more energy, there's more volume, there's more thickness, and chords"	Performance: expectat.
		Representational	Reappearances: *triplet motif (m. 65, 67, 69, 71-77; arpeggios (m. 68, 70); loudest; thick chords	Performance: possibility Performance: interven.
Coda (1)	Causal	Referential (Intra)	Repetition: four 'Z's; return to top (like var. 1)	Performance: structure
		Referential (Extra)	You've actually conquered that, and you're comfortable with the fact that that's happened; Z's	Performance: narrative
		Corporeal	"Depends on the mood", "the bit where I thought", "I just thought…that's dealt with"	Self-based Performance: interven.

		Representational	New harmony: m. 79-80; slower, return to high pitch, soft dynamics, sparse texture like var. 1	Performance: possibility Performance: interven.
Coda (2)	Causal	Referential (Intra)	Repetition: flower (like var.3), refer to black box	Performance: structure
		Referential (Extra)	"You can actually continue to blossom again without being dragged down by this"; "It's time to stop worrying"; flower	Performance: narrative
		Collaborative	"And you want him to communicate that"	Social-based
		Representational	m. 81-82: long sustained chords, expanding over a wide register on the piano, fermatas	Performance: possibility Performance: interven.
Coda (3)	Causal	Referential (Intra)	Repetition: happy face (like var.4); decrescendo	Performance: structure
		Referential (Extra)	"tailing off to a resolution that's a peaceful one; you've come through something"	Performance: narrative
		Corporeal	"I would probably have subconsciously [thought]: story told, if you like"	Self-based Performance: interven.
		Representational	Sustained expansive chords, rit., fermata, softest dynamics, highest register, fades into stillness	Performance: possibility Performance: interven.

Ron's Improvisation on the Musical Stimulus:

Types of Reflection-Based Mental Representations and Constructed Meanings

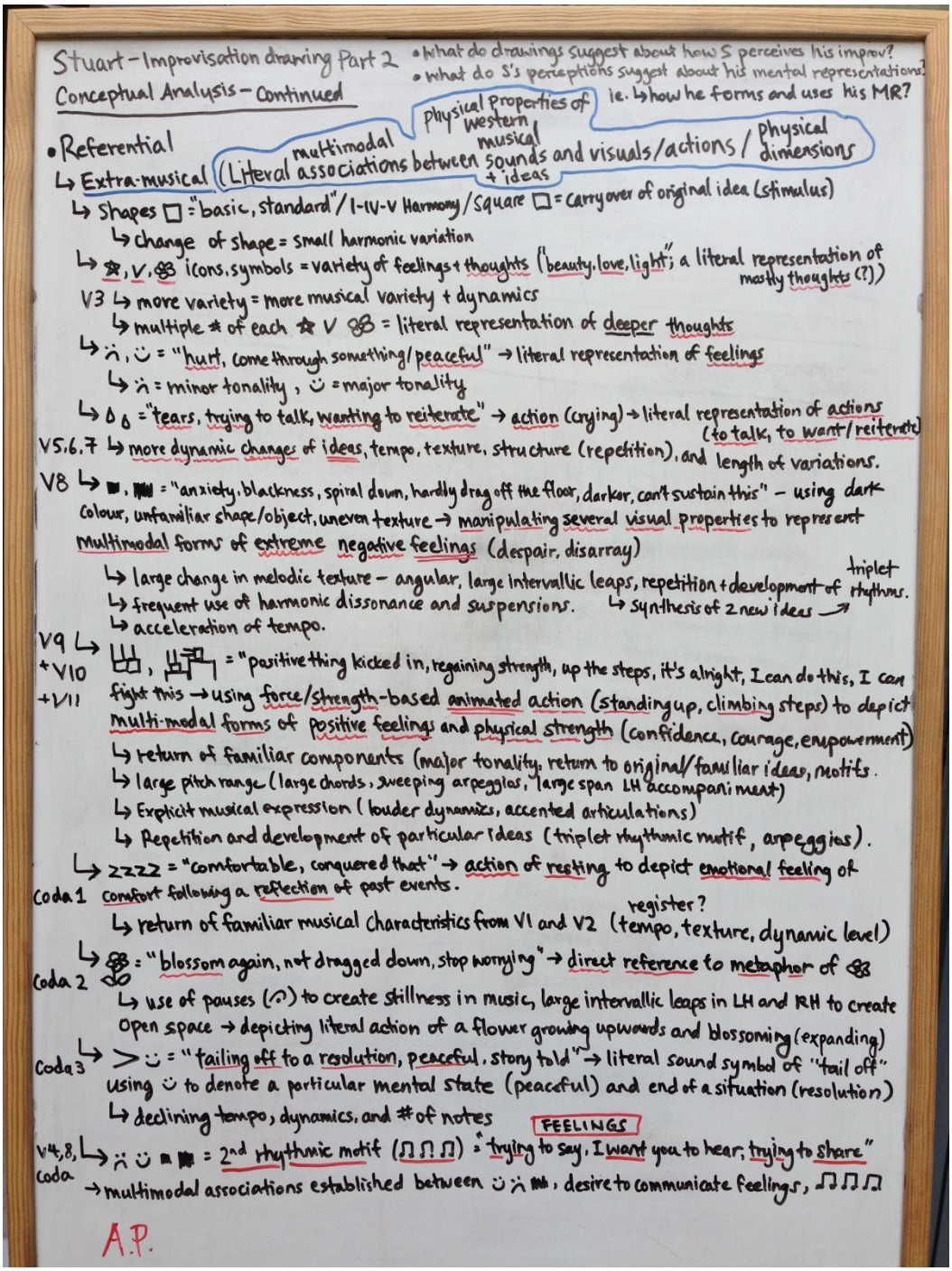
Sections	**Meanings constructed**		**Evidence in the data**	**Type of Reflection MR**
Recitative (Intro) m. 1-7	Causal	Referential (Intra)	Repetition and variation: three shapes from stimulus drawing (symbolizing blocked chords); "this is the beginning of the piece, that's a one…Those chords, it wasn't too expansive yet."	Performance: structure
		Causal	Three shapes: texture and range of chords	Performance: structure
		Referential (Extra)	"a…deep feeling…love for something, but tenderness at the same time."	Self-based
		Corporeal	"I really started feeling something from the music. That was a fun spot for me, because I knew that I could make it my own. It probably happened a little bit right at the beginning, because I played those chords in a certain way."	Self-based
		Representational	Variation of harmony, chord texture expanded to lower range of piano, same melody and key	Performance: possibility Performance: intervention
Aria (A) Beginning m. 7-9	Causal	Referential (Intra)	Variation, repetition, growth: larger shape (like 1); "and then I moved down the keyboard and it got a little richer (*writes a 2*)."	Performance: structure
		Referential (Extra)	"a…deep feeling…love for something, but tenderness at the same time."	Self-based
		Corporeal	(1) "and then I moved down the keyboard and it got a little richer (*writes a 2*)." (2) At a certain point when that emotion kicked in… it happened pretty quickly, but I really started feeling something from the music. That was a fun spot for me, because I knew	Self-based (1,2,3) Performance: musical possibilities (2,3) Performance:

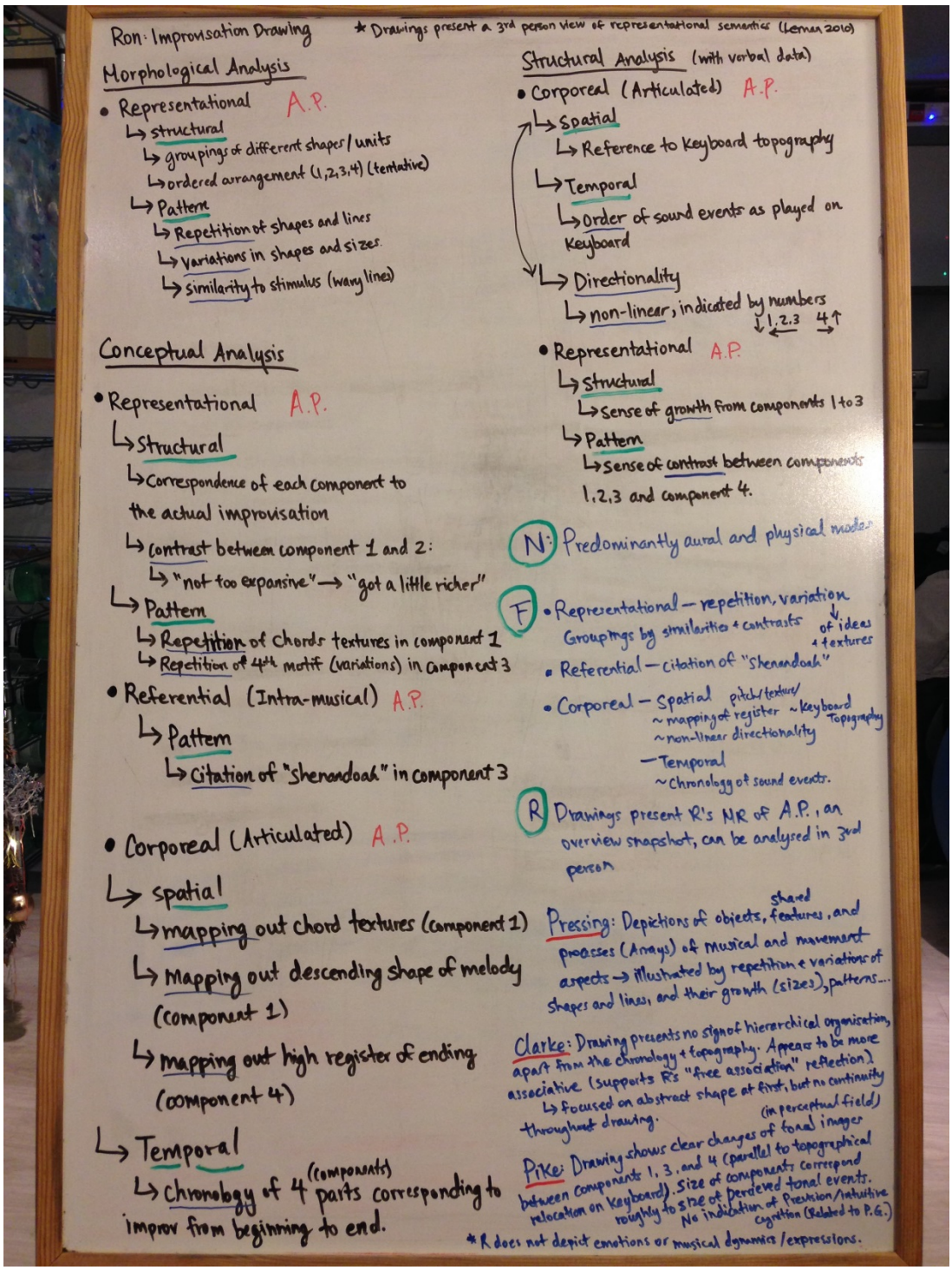
			that I could make it my own…It happened a little later, but it's particularly when we went to that: (*R plays Db-C-Bb-Ab*). I started rolling with it a little bit… At that point I just forgot everything. I could do whatever I wanted. (3) When I got to that point, when I got to the end (*R plays the notes Db-C-Bb-Ab*), I said 'Ok, that's Shenandoah'. So…I did more of a free association kind of thing. I got to the end [of the introduction], and I decided to just improvise over that.	intervention opportunities (2,3)
		Representational	m. 7: fermatas; m. 9: new motifs, rhythms, harmony, and accompaniment figure; lower piano register	Performance: possibility Performance: intervention
*Aria (A) (continued) m.10-13 *Aria (B) m. 14-19 *Recitative (Reprise) m. 20-30 *Coda (Part 1) m. 31-32	Causal	Referential (Intra)	<u>Variation, duplication, growth</u>: 4 shapes (like part 1 & 2); "And then three was that Shenandoah part."	Performance: structure
		Corporeal	I had played the song "Shenandoah" before... And that little motif reminds me know of it… I didn't really go to the song but I maybe played that part a little bit like I was playing "Shenandoah". I did more of a free association kind of thing…I came back to other melodies at different times. And one point I played this (*R plays the second melodic phrase: Ab-Gb-Gb-F-Gb-Ab-Gb-F-F*) and I decided to echo it in the left-hand (*R plays a variant with his left-hand: Gb-F-F-Eb-Eb-Eb-F-Gb-Ab*).	Self-based Performance: possibility Performance: intervention Performance: expectation Performance: structure
		Representational	***Aria (A) m.10-13*** <u>Growth:</u> New motifs based on inverted 'Shenandoah' notes: m. 11; new harmony; new accompaniment; echo of original 'Shenandoah: m.12-	Performance: possibility Performance: intervention

			13; m. 11-13: pauses and tempo variance; increase in movement of accompaniment and keyboard range (over 2 octaves) Repetition and variation: previous new motifs repeated and developed (green, purple, gold). ***Aria (B) m. 14-19*** Repetition & variation: previous motifs and figures (purple, peach, pink, green, blue), Growth: expansion of keyboard register, continued harmonic tension, louder (m. 17-19) ***Recitative (Reprise) m. 20-29*** Repetition & variation: previous motifs and figures (purple, pink, brown, red, green, blue); harmonic progression; repetition of original first, second, and third motif. Growth: harmonic tension continued; increase in dynamics (m. 26), melodic echoes (m. 22-23); thicker textures and chords (m. 25 – 28); dramatic expansion on range and keyboard, expansion of original third motif from musical stimulus ***Coda (Part 1) m. 30-32*** Repetition & variation: original fourth motif, previous new motifs (purple, green, pink), decreased dynamics Growth: bringing back of original fourth motif ***All together, the four Sections show a free association through appearances of various melody without any obvious structure (ABA)***	
Coda (Part 2) m. 33-34	Caus	Referential (Intra)	Repetition and variation: thin lines from drawing of stimulus made longer; "And then up here was the end (*writes a 4*)."	Performance: structure

	a l	Representational	<u>Repetition and variation:</u> repetition of original second melodic motif but different harmony, original high register where second motif was played. <u>Growth</u>: use of iv harmony, new articulation (rolled chord)	Performance: possibility Performance: intervention

Appendix C: Example of drawing analysis (first level)




Ron: Improvisation Drawing
★ Drawings present a 3rd person view of representational semantics (Leman 2010)
Morphological Analysis
• Representational A.P.
↳ structural
↳ groupings of different shapes / units
↳ ordered arrangement (1,2,3,4) (tentative)
↳ Pattern
↳ Repetition of shapes and lines
↳ Variations in shapes and sizes
↳ similarity to stimulus (wavy line)
Conceptual Analysis
• Representational A.P.
↳ Structural
↳ Correspondence of each component to the actual improvisation
↳ contrast between component 1 and 2:
↳ "not too expansive" → "got a little richer"
↳ Pattern
↳ Repetition of chords textures in component 1
↳ Repetition of 4th motif (variations) in component 3
• Referential (Intra-musical) A.P.
↳ Pattern
↳ Citation of "Shenandoah" in component 3
• Corporeal (Articulated) A.P.
↳ spatial
↳ mapping out chord textures (component 1)
↳ Mapping out descending shape of melody (component 1)
↳ mapping out high register of ending (component 4)
↳ Temporal
↳ Chronology of 4 (components) parts corresponding to improv from beginning to end.
Structural Analysis (with verbal data)
• Corporeal (Articulated) A.P.
↳ Spatial
↳ Reference to keyboard topography
↳ Temporal
↳ Order of sound events as played on keyboard
↳ Directionality
↳ non-linear, indicated by numbers
↓ 1,2,3 4 ↑
• Representational A.P.
↳ Structural
↳ Sense of growth from components 1 to 3
↳ Pattern
↳ Sense of contrast between components 1,2,3 and component 4.
N: Predominantly aural and physical modes
F • Representational — repetition, variation
Groupings by similarities + contrasts of ideas + textures
• Referential — citation of "Shenandoah"
• Corporeal — Spatial pitch/texture/ ~mapping of register ~keyboard topography ~non-linear directionality
— Temporal ~Chronology of sound events.
R Drawings present R's NR of A.P., an overview snapshot, can be analysed in 3rd person
Pressing: Depictions of objects, shared features, and processes (Arrays) of musical and movement aspects → illustrated by repetition + variations of shapes and lines, and their growth (sizes), patterns...
Clarke: Drawing presents no sign of hierarchical organization, apart from the chronology + topography. Appears to be more associative (supports R's "free association" reflection)
↳ focused on abstract shape at first, but no continuity throughout drawing. (in perceptual field)
Pike: Drawing shows clear changes of tonal images between components 1, 3, and 4 (parallel to topographical relocation on keyboard). Size of components correspond roughly to size of perceived tonal events.
No indication of Precision / intuitive cognition (Related to P.G.)
* R does not depict emotions or musical dynamics / expressions.

Appendix D: Participant consent form

Consent Form for Interview Participants

Frances Shih
Peterhouse, Trumpington Street
University of Cambridge, CB2 1RD
(Mobile): 07788254709
fs362@cam.ac.uk

Dear _____,

My name is Frances Shih, and I am a PhD student from the Faculty of Education at the University of Cambridge. I am conducting a multiple case study examining and documenting the role of memory processes in the keyboard improvisation performances across the genres of jazz, popular, and classical music. Specifically, questions being addressed include: what do improvisers think of (or are conscious of) as they improvise? What acoustical elements catch the improviser's ear? How do they develop a theme/motif and work within a given framework? What are the improviser's emotional experiences during the performance? What messages did the improviser wish to convey during the improvisations and how did they achieve this? What difficulties did the improviser encounter during the performance? My aim is to obtain musical and text transcriptions of all performances, and to provide an analysis using rich description from my interviewees' words detailing their experiences of the improvisation and memorisation process.

You are being asked to take part in a pilot study being conducted by Frances Shih for a doctoral thesis under the supervision of Dr. Pamela Burnard in the Faculty of Education at the University of Cambridge. I am inviting you to participate because of your role as a professional improvising musician. The following information is being provided to you in order that you will be as well informed as possible about the research in which you have been asked to participate. If you have any questions regarding this information, or any aspects of this study, please feel free to ask the researcher about this project before you complete this form.

Project Title

The Role of Memory in Keyboard Improvisation Performances of Jazz, Popular, and Classical Music

Procedures

Your participation will include an individual interview and performance sessions of up to 90 minutes through Skype. With your consent, the interview will be audio-and-video recorded using the software program 'CallNote Premium' in order to transcribe your remarks verbatim, and I may take notes during this time. In order to obtain some consistency on the data analysis of how memory processes interact during improvisations, I will be asking you to memorise up to four short tunes of different styles and varying lengths, perform improvisations on the tune, and then to ask you questions reflecting over the performances. Through a collaborative online drawing platform, I will ask you to draw your particular experiences of the

memorisation and improvisation process for each piece. These visual illustrations will be kept and analysed as part of the study.

I will start the interview by asking you some open-ended questions about your background in musical training, and your experiences in musical improvisation. I will then play to you one of the four musical samples that vary from 25 to 90 seconds, which features both melodic and harmonic components. You can memorise each tune in any way and with as much time as you like. I especially encourage you to talk through the way you memorise the music, during which I will also ask you to draw out your visual interpretation of this audio clip through a collaborative online drawing platform (which I will send to you through a link). The data from this virtual drawing will hopefully indicate which motifs, harmonies, and Sections of the piece stood out to you the most.

When the musical sample has been memorised to your liking, I will ask you to perform an improvisation (or several, if you wish!) using the materials from each musical sample. All of the improvisation(s) will be recorded. After the improvisation(s), I will play back your performance several times, pause in particular parts, and have you reflect on what you were thinking as you were improvising. I will also ask you to draw out your visual interpretations of the improvised performance, using the same drawing platform. Your virtual drawing(s) of the improvisation(s), along with your reflections, may help to shed some insight for the analysis on how the materials you have memorised earlier becomes transformed in your improvising ear and mind. The memorisation and improvisation process will then be repeated with the remaining three musical samples.

I plan to provide you with an individual copy of the transcription and illustrations so that you may correct, clarify, or add to your comments and drawings made during the session. I may need to contact you for clarification with regards to the interview content. Upon receiving the raw data, I will give you at least three weeks to review the transcript, and if I have not heard back from you by the deadline, I will assume you agree with the transcriptions and illustrations as written and presented.

Confidentiality and Safeguards

Your participation in this study is purely voluntary and is independent of any other expectations on the part of the investigator. Furthermore, you have the right to refuse to answer any questions or to discontinue your involvement in this study at any given time, for any or no reason, without being subjected to any prejudice on the part of the investigator. The information obtained about you will be examined in terms of how a classically trained musician perceives the role of the genre and practice of classical music improvisation in their musical training. In the reporting of these findings, you shall remain completely anonymous. I promise to keep all information you provide strictly confidential, not attribute it to you, and to use a pseudonym in place of your real name. I will alter or delete any information that might reveal your identity, or the identity of others you might mention.

Risks and/or Discomforts

The study is designed to minimize potential risks to participants. You may be vulnerable to a breach of confidentiality, but I will protect you from this by the measures discussed in in the Section on Confidentiality and Safeguards. If, at any time, you have any concerns or

questions, several people will be available to discuss them with you and to inform you of options for ameliorating them. You may call the researcher collect at 07788254709, or the Higher Degrees Coordinator in the Faculty of Education at 01223-767726, whose function serves to monitor all research projects.

Benefits

You may find participation in this research project rewarding. Your involvement will contribute towards illuminating any relationships shared between the memorisation and improvisation processes of professional improvising musicians, and may help to draw out significant educational implications.

Summary Report

At the conclusion of this research project, a summary report containing the results and outcomes of the study will be made available for your review. If you would like to receive a copy, please write your address here:

_____

_____

_____

Signatures

I have explained the above components and conditions to this study. I have also provided an opportunity for this participant to ask questions and have attempted to provide satisfactory answers to any questions that have been asked in the course of this explanation.

Research Investigator: _____

Date: _____

I have read the above information, have had the opportunity to ask questions about this information, and hereby acknowledge my voluntary participation in this study.
The participant will receive a copy of this consent form to keep.

Research Participant: _____

Date: _____

Appendix E: Sample of coded interview transcription

F: First I'm going to start with this one. This is a piece that actually George Shearing - he made it up on the spot and he used it (the melody) as an improvisation later. It's a 20 second clip as you can see. So I'm going to play it as many times as you want.

S: (Listens). Let me just try that. First hearing

1:07 - (S starts playing in D major.) Focuses on the key

S: is it in D? REPRESENTATIONAL

F: I don't know the key, actually.

1:19 - (S plays most of the melody (1-3 motifs) accurately in the right register with parts of LH made up) Establishes melodic contour, Establishes register

S: It was something like that wasn't it?

F: Yes. I'm going to play and stop at any time you want, so there's no restriction...

S: Okay. It **reminds me of a pop song** as well that does that, but that's how I can do it as much as that. It's very like a...a pop song. So is that like a classical tune? Association to another piece and style INTRA MUSICAL

F: It's a made up piece, it's completely made up by the pianist George Shearing.

S: Really? I didn't know that.

F: Yes, that's why I chose it, because it's unlikely that anyone would know it, unless they heard it on youtube.

S: It does sound like...but yeah.

2:10 - (S Listens again. Plays D major chord, realises it's in D-flat major and changes.) Second hearing

F: I can stop here (after phrase 2).

S: Yeah, okay.

2:14 - Tries out the melody in D-flat major this time. Establishes the key

S: So that would just be playing what I heard there, but do you mean if then I try to improvise on it?

F: Yeah. But I actually I was wondering if I can see how do you approach understanding the harmony and the melody of this short clip.

S: That first...that I've just heard?

F: Basically, the whole thing really.

S: ...Yeah, okay.

2:47 - (Listens to entire clip) Third hearing

S: Actually yeah, I see it as a I-IV-V chord progression straight away, with the odd minor thrown in. Focuses on harmonic progression REPRESENTATIONAL

3:05 - plays the end of the melody twice (in D flat major)

S: Yeah, it's sort of a... (starts playing the chords D-flat, A--flat, G-flat, D-flat while humming the melody accurately). Er, there's a minor, there's a minor (chord) somewhere (plays the D-flat minor chord). So... REPRESENTATIONAL

3:21 - (starts humming the melody again, this time louder, while playing the harmonic progression in LH. When he reaches singing and playing the second phrase, he identifies where the minor chord is). There! (plays G Flat minor chord). (Continues singing phrases 3 and 4 while matching the LH to it). Establishes harmonic progression

S: Yeah, to me that is a I-IV-V, so it's just like...(starts playing **Mozart's** sonata in C major)...when I first heard that, so that's one I-IV-V chord progression. Let's have another listen. Association to another piece (abstract transference of harmony) INTRA MUSICAL

3:52 - (Listens up to third phrase. F pauses the clip) Fourth hearing

S: Yeah. So what I heard then, was sort of... (plays the melody with LH chords in higher register)...just one chord in the bass...(keeps playing)...something like that isn't it?

F: Yeah. Well, keep playing, there's no limit at all.

4:57 - (S plays his melody over chords, which starts to have some rock-like rhythm.) Something like that?

5:03 - (S Listens to entire clip closely, notes the trill ornament in second phrase)

Fifth hearing

5:31 plays the theme softly, with LH in higher mid range. Emulates the dynamics and phrasing of clip. Establishes original character.

S: Yeah, there's that de-luh-lah right there. Right...(starts playing over the melody and chords more slowly, this time adds ornament in RH. Pauses at 3rd phrase). Focuses on ornaments REPRESENTATIONAL

F: I'll get it...I'm going to play it for you as many times (proceeds to play clip).

5:45 - (S listens to phrases 3 and 4). Sixth hearing

S: The next two couple of....

5:48 - (S Listens from beginning of clip, starts picking out some chords in LH while simultaneously listening to phrases 3 and 4)... Yeah Seventh hearing

6:17 - (F loops clip back to beginning twice so S can match his LH chords while he is listening to phrases 1 and 2.. S starts humming phrase 3 while matching LH chords to it.)

F: Are you already mapping out the theoretical part of it? Because right away you do a very standard chord progression.

S: (7:01) Yeah, yeah, it is, it is, definitely, mainly just a I-IV-V, so like... (plays while talking to point out the progression)...there's a chord of I, chord of V, IV, minor (iv), (plays melody with ornament in phrase 2). Then it's something like em... Edits harmonic progression ANALYSIS PART 1: ESTABLISHEMENT OF ESSENTIAL CONCEPTUAL STRUCTURE AND FEATURES REPRESENTATIONAL

(LEARNING STRUCTURE)

Listens to the stimulus seven times, over a duration of seven minutes.

7:23 - (plays phrases 3, and proceeds to phrase 4 with some pauses)

S: Yeah, it's just all I-IV-V...yes

F: So, what kind of emotions are conjured up for you by this clip?

S: Ah...now! So if I played it, would I have to play it as it is, or can I play it as I would normally...?

F: Of course, but I meant just describing the melody itself..yeah!

7:51 - (S starts playing around with the melody)

F: What would you think of before improvising on this tune? What ideas would you get from this?

S: So if that was an **emotion**, then....(starts playing the melody and harmony at the same time) well, first of all, just the **harmony of those chords**, they sound quite - not too...menacing, probably not to deep really; quite pleasant. Chords are distinct from harmony. Chords alone speak little, it's about how they are combined, progress and move (gestures in a **wave** – angular harmonic contour?). So, probably fairly lighthearted. That's the pictures those harmonies tend to create for me. So something fairly light, so nothing too worrying. So if I was going to improvise - if those thoughts sort of came to me I would sort of...(starts playing) ANALYSIS PART 2: HIERARCHY, COMBINATIONS, AND ROLES OF PARTICULAR SOUNDS

Particular combination of harmonies create a pleasant picture

EXTRA MUSICAL

8:39: (Plays tune with some minor variations between RH and LH).

S: And then I'd probably make it more romantic. You know, naturally I'd want it to feel more romantic. So, I'd probably add some... Sound association to romance

9:07 - (starts playing in a wider register range with bigger chords, adding some filligree orgnaments in the RH) Exploring range

S: Maybe even throw in a slightly different chord to make it sound...(plays a ii chord underlying phrase 4). And probably I'd sort of go minor...

9:32 - (S starts playing melody in D flat minor, towards the upper register for both LH and RH. At 10:05 reversts back to D flat major in lower to middle register. Corrects from D-flat chord to G flat chord on phrase 2. Minor iv and ornaments continue to stay in phrase 2. Plays around, frowns a bit at the F sharp in the LH. Exploring character change options though key

and harmony BUILDING AND CONTEXTUALISING A SOUND VOCABULARY IN MULTIPLE DIMENSIONS

(drafting an improvisation, exploring, playing with basic units) CAUSAL for key change discovers not good key

S: And then I'd actually probably change into a key that I felt a little more comfortable so I could do more, and put more emotion in. So I might go...I'd have to do some sort of... Maximising efficiency of execution, Physical ease of navigation, CORPOREAL

10:32 - (S modulates from D flat major, to C major, then to F major. Proceeds to play melody in F major. Starts some rhythmic variations in melody.) INTRA MUSICAL

S: Now the problem is, at the moment I'm concentrating too much, and not letting go. I'm not actually thinking of emotional things, I'm concentrating on what I'm doing. So I'm going to try and let go now and think of something...so here we go...

Overconcentration obstructing flow. Connecting sound to emotions.

11:23 - (S starts improvising in F major). ESTABLISHING FLOW: ATTENDING TO PHYICAL AND MENTAL ASPECTS, CORPOREAL, EXTRA MUSICAL

12:43 - I mean, if I try to take it deeper than that, em... (while playing, closes the melody and goes into a transition, modulates to D minor.)

Focus on deeper development

16:19 - (S ends, takes off glasses immediately, turns around and smile. F claps.)

F: Wow!

S: You see, it's okay if I (sweat/let) things off. Its like, at times I found myself thinking "what shall I do?", and then it's all gone, you see. As soon as I thought, "Oh, what shall I do next?", that's when it completely goes (apart), it just ends up being nothing - a load of nothing, just (singling). But when I think about a subject that's in my head that's made me very emotional, that's when something really does happen.

Questioning of self is unproductive

Planning ahead is unhelpful

Need a guiding subject matter

F: What was the subject in your head? Is it describable?

INTRA MUSICAL, EXTRA MUSICAL, REPRESENTATIONAL,

S: It's to do with, sort of, a relationship (gestures). That would be...a real relationship that's sort of romantic, and then in comes - creeps, sort of, some....**and I didn't put too much in that then**, but sort of, the tenderness of it, but then **mixed with some hurt**, you know...sort of some...(**demonstrates a variation, soft (pp) version of the minor part in the improvisation**). Associating hurt with soft and minor sounds. When it would have gone to that; sort of the absolute...hardly being able to drag yourself offs the floor..(pauses talking while keeping eyes closed and resuming playing and listening to the harmonies. Play sings in mid to low register, dissonance in melody using suspension, accenting short-short-long

rhythm) Associating despair with descent motion, lower register. developing the narrative, living the narrative...but still kind of thinking of the romance, and trying to tell that person that here's the feelings and "I want you to hear them" Associating communicating effort with note repetition (plays variation of minor melody, rising up to higher register in melody 18:22) in the **hope** that it will improve that sort of loss. Associating hope with ascension to higher pitch. Associating hope with major key and crescendo. Communicating the narrative And then, sort of regaining strength, and thinking "I can fight this" (starts a crescendo in his playing) "you know, either way, I can fight what happens" (lets go and plays full volume with rich chords and intensity for a few seconds before slowing down) Associating loudness and moving rhythm to personal strength and just trying to share that you do have feelings and sensitivity. And you want him to communicate that, that you're a person who has got some feelings. Associating sensitivity with soft sound (decrescendo, LH becomes sparse, RH goes back up to higher register, slows down, finishes playing, turns around). That would probably be what went on in my head. (laughs).

Building a narrative arc on subject with several units. SYNTHESIS OF IDEAS AND STRUCTURE FROM THE SOUND VOCABULARY (he is reusing motifs)

Assigning emotional expression to multi dimensions of sounds

F: And when you did the variation of the theme with the emphasised notes (sings) was it a way of 'talking', like stressing one 'word' over another?

S: Yeah, I think it is! Yeah, let's say it's sort of slightly, not really **discordant**, but it's sort of a bit more...(plays a variant of that melodic development with **sparse** accompaniment)...think it's trying to emphasise some underlying deep anguish really subtlety of discord harmony highlights more hidden depth of anguish (plays b minor chord, with melodic emphasis on B, A, and C in RH). Range and possibilities of emotional sound expressions I mean you **could take it to a lot deeper level** Triplets as units for further development INTRA MUSICAL (continues melodic emphasis into lower register notes using **triplet rhythm**, all the time with crescendo and more intensity, makes a LH vs RH dialogue, using cross over technique. 20:13 - reaches a peak at loud tritone chords in RH and LH apart in wide registers, sounding almost atonal, before the music slows and calms down to a single note over the ringing over the atonal chords. Starts a new variant on the eight notes rhythm of the melody, which sounds more and more atonal. S pauses and turns around)...And that would be sort of, let's say you're getting very, almost panic, and anxiety. Atonal associated with madness and anxiety. And this bit after would probably mean (plays D Eb D Ab twice in RH) it's almost like a certain madness in your head, because it's not kind of making it...(keeps playing the 'panic' theme repeatedly with variations) it's just like aimlessly, wondering around with no hope or anchor point, do you see what I mean? But it's not really pre-meditated. It's almost like when I've done something, I've kind of realise why it's happened after. Improvisation as a reflective process So I don't think: 'we'll, I'll do that because that will sound as if it's almost going mad in your head, and therefore I'll do that. It's like that's the thought that's happening so it **automatically happens**, Direct translation from head to body and sounds and then, like you said, analyse why you did that. That would be the why, do you see what I mean? (extension of sound vocabulary)

F: I see, so it's like in retrospect. But in such a short amount of time, you really make that theme (melody from clip) your's. I notice you took that motif (sings), and I heard that.

S: Yeah! I didn't even realise until you said that.

F: Really! I thought that was completely conscious, because it appeared everywhere.

GUIDING MUSICAL PRINCIPLES AND BELIEFS

S: You obviously saying that has made me just realise that I did it. And that's why... you know, when I hear people on T.V., and the documentaries, and they analyse works by composers, and I think, they say "oh, he did this, and he chose this key, and he went into that key purposely, so I'm going to go into G sharp minor because I'm feeling this", and I think: No, he didn't do that. He sat at his piano in anguish there, he put his hands on (the keyboard), and he tried to get it all out of himself, and played and played. Emotion drives the sounds And then afterwards, you lot analysed it, and made those conclusions, but in the opposite order to what they were done. Contemporary musical analysis without performers words is not enough to understand the musical meaning Because that's the pattern I've noticed as well. Because to me, any composer is going to put his hands on the keys, and whatever is going on in his head, whatever intensity, is going to come out, and he's not going to be able to premeditate anything. He's not in any position for thinking, "Oh, that's right, G sharp minor!". He's in the position of thinking, "I wanna die", or you know, "I want to live with this person"...all of those things are going through his head while things are coming out there (his hands). And the last thing that will ever be coming into his head is "Oh, I think I'll repeat that bit over", do you know what I mean? And that's where I think, when I hear these documentaries, I think: they've actually got it back to front. Sounds reflect emotional thinking He did that because of that - No. He did that becuase of what was going on in his head and his emotions. And then afterwards, it's being analysed and says, 'Well, he portrayed...he's used this scale, or"...do you know what I mean? But it's more likely to be them...they're going to have pointed out (the ???)...I mean**, even when I've played by ear from a little boy, and I've made up my own scales** - I'd be sort of...(plays some boogie woogie)...But then someone will go and say, "Oh you're using there the pentatonic, or you're using there the jazz scale, or you're using a variation on the jazz scale there because you've mixed the blues and the jazz scale, or you've played suspended fourths there"...but it's actually, I didn't even know what the note of D was at the time. So if you like, I would be doing all of that, they would then be saying, "you did that, that and that." And that's how I realised that when they're analysing it, they had got it the wrong way around saying "he chose that because of that emotion" and it's actually the opposite. Because before I knew anything about keys or anything, all **I knew was the sound that these keys were making**. Creating what sounds good is intuitive

F: But you knew what sounded good though?

S: Yeah, that's exactly why...

F: And the decision of how to make that sound good...that enables you to do what you did right here...How do you know why that would sound good?

(Start findings Section with his general view + approach of how music is created)

S: I mean it's almost **trial and error** isn't it? If you're sort of going...(plays a melody consisting of high D and B's) and you think (while contemplating the B): well actually, I don't like that because here I'm trying to write something romantic, or I'm tring to portray a feeling that I want to show to a girl. I want to show this piece and say: look, this is how I felt. I don't actually want to go like that (points out the B) so I'm not going to do that. So, you've already eliminated that, haven't you, as you're going along in trial and error, so you then like: (plays melody which alternates between D A C A, goes into G G F F E F D)...and you think: Oh they will fit quite nicely (starts playing filligree ornaments using same notes, accelerating,

ending on a sharp F D B A!), and you think: no, I don't like it, it's the B that's coming in. But if you sit there thinking: what do I actually want to portray something very serious anxiety going on here, then you might sort of go...(plays sharp attacks on B followed by F and Es)...so that B's working now (expands sharp attacks to some flat notes). (stops playing) Because you see, there's no rules really. **You're trying to portray something**, Sounds are a medium for portrayal of emotions and you're going to say: well, how does it work, or not? (Resumes playing the attacks notes of the melody) Do I sound like a guy who is losing his rockers there, who is wandering around aimlessly, going completely insane, not knowing what was happening to himself. Or would this portray it better, a harmonic D going (plays some tonal and serene melody in D)...it wouldn't, would it? So someone might say, well you've just indiscriminately chosen notes there that don't mean anything. You say: well, why don't they? They mean a lot more than the ones you're giving me. Monitoring and comparison of emotional goal and current sound image So again, it always seems to be about listening, and connecting, and also is it going to communicate something with somebody? Assessing whether emotional goal is delivered effectively to audience I mean, if I've had to do dramatic music for like a play or something, and it's like, you know, 'agony', then I'll be thinking: well...(plays some crashing dissonant chords using strings timbre on synthesiser)...well you just hear some semitones there, so is it working or not? Are you watching this 'agony' here, the passion story, carrying the cross, which I had to do in certain music to it, and it was like...(repeats crashing semitone/dissonant chords)...you know, carrying the cross, of which I had to do for this 'Passion' play, and you look at people, and suddenly instead of just doing their shopping and going: Oh what's this musical play? I've got to get me Easter eggs or whatever it is, they're like, "God, this is heavy, man. He's got this and it feels like agony." And the thing is you're just **choosing notes you think is going to represent agony**. Active note choice to represent emotion (which becomes automatic later) If you play and it does, then it's right, isn't it? And that's a person using your ear and saying: well, that's right, because you're going to ask me to play a mixolydian scale, and everybody is just going to carry on shopping and think: Oh I wish this play would finish, I'm trying to get me Easter Eggs. Must combine sound and texture effectively to match emotion You see what I mean? (laughs)

F: S, would you like to listen to what you played?

S: Well, not really but...(laughs)...no, go on, go on...

F: No, I didn't...I actually started recording when you said I'm going to forget this...

S: Oh good! That's good, that's better. (laughs)

29:49 (S and F listens to S's improvisation. S comments on clarity of recording).

MULTITASKING AND MONITORING FROM MULTIPLE PERSPECTIVES (a constant mind field: the self, the audience, the narrative, the goal, the possibilities, the options)

S: **See there** (30:20) you're trying to express some tenderness; communicate with the person and with the audience. You're trying to say: look, this is what we all feel, and we can kind of all admit it together. Establish connection with audience, placing audience in contextualised situation, making audience part of the story, (audience monitoring), engaging with audience as actor EXTRA MUSICAL, COLLABORATIVE

F: You really let go there (30:39) (S laughs) what...?

S: Yeah, you sort of...you get a surge of...you know if **you're in a pattern of thought,** already following a narrative, living the narrative as a character you get a surge of: "I can do

this, I can do it!" and **that gives you more impetus** to do some deep chordal...(self monitoring) Focus on the self, **living the self narrative** (has two roles in monitoring and flow), translating strength to loudness, micro moment of expression CAUSAL

F: You said here (30:55) you're trying to take it deeper...and you want to even...transform it more?

S: Yeah, to portray something more...(listens) I mean, that's still quite sort of (in there) but **it hasn't gone really**....(listens)..potential, options (product goal)

F: Here's a turn, you're taking a turn here (31:22)

S: Yeah. (F and S laughs) (31:31) So this is just another level of depth really awareness of improvisation structure, Section chunking, conceptual monitoring knowing the structure REPRESENTATIONAL and being able to locate it INTRA MUSICAL only a slight...comparison of intensity and to say: look, I'm trying to say something here. There, it's a bit **slower**, and you're wanting to **reiterate** something, so you're saying: look, I'm trying to talk to you and I'm expressing an emotion. Translates ideas into a **Monologue (multitask – acting – talking with imaginary)** musical grammar, Repetition as communication device (31:55) And also you know, you could be starting to **spiral down**, and it's starting to lose the niceties around the (edge?). EXTRA MUSICAL SYNTHSISING IDEAS AND STRUCTURE FROM THE SOUND VOCABULARY

S: (listens to triplets (32:39) in minor Section)...You see, **sometimes**, I just think I'll have a **frivolous moment and try anything** just to enjoy myself. (fun part for him despite being in the darkest musical Section)

(Monitoring risk taking)

MULTITASKING AND MONITORING FROM MULTIPLE PERSPECTIVES (a constant mind field: the self, the audience, the narrative, the goal, the possibilities, the options)

What are the most significant musical events under each theme – use Mills 2012 (changes in tempo)

F: And that was that moment? (pointing out the triplets)

S: Yeah (laughs).

F: Wow (pointing out D major Section (33:00). Is this almost like an ABA form? I couldn't figure out...did you have a variation form in mind or **ABA**?

A DEEP GROUNDNG OF SELF IDENTITY

S: No (laughs). But you see, I'm **used to doing**...habitual use of familiar structural device well, **when I've improvised a motif, even though it's only a few notes, it's stuck in my head, so then I will keep coming back to it**. Own creation sticks around Even in the stuff that I do...I'll let you take one of the CDs (S goes to fetch his recordings, clip is paused. F and S talk over S's recording). REPRESENTATION, INTRA MUSICAL (grammar for note)

(34:57) clip resumes playing; S and F listens.

S: See, that's **the mixture of thinking**: (35:14) let's have a contrast (referring to arppeggio runs) to keep the communication interesting, because if you think you're losing the person

you're communicating with...a mixture of self focus, critic monitoring – impartial from third person, living the narrative

MULTITASKING AND MONITORING FROM MULTIPLE PERSPECTIVES (a constant mind field: the self, the audience, the narrative, the goal, the possibilities, the options), COLLABORATIVE, CAUSAL,

F: Oh...did you think you were losing me? (laughs)

A DEEP GROUNDNG OF SELF IDENTITY

S: Well, it's probably **one of my traits of my style will be to vary quite a lot the contrast**. CAUSAL Awareness of style and strategies So it probably will have been at first: well, let's change the course of this. CAUSAL And then thinking: back to the emotion, "I can fight this". EXTRA MUSICAL (monologue task) And then that's when...that would, you know, you'd be thinking: "Well, I can fight this." So there's more energy, there's more volume, there's more thickness, and chords REPRESENTATIONAL (self monitoring / execution task / meeting projected goal of sound)...Rapid switching of monitoring and emotion \ MULTITASKING AND MONITORING FROM MULTIPLE PERSPECTIVES (a constant mind field: the self, the audience, the critic, the narrative, the goal, the possibilities, the options)

F: So there's part of you that's kind of monitoring: Mm, how is this going?...A trajectory of: Am I still with the audience, but yet the other part is emotional...how do you balance these two, one very practical and the other...well...?

S: Well, that's right, that is a **balance**, because if you're playing to an audience, and as soon as you lose them, you've lost the **communication** and therefore...(multi-logue, dialogue, monologue) COLLABORATIVE

F: But how do you know if you're losing them? Because you're not talking while you're playing. What kind of energy do you feel, or is it something you feel yourself?

S: The thing is they might not be giving off that energy, but you just know yourself that something **after X amount of time**, however much it's trying to say, there's a cut off point to where someone says: Yeah, well I've heard you talking about all of that...and it's the same thing with music really. Every idea has a lifespan (monitoring lifespan of ideas), Places oneself as audience I think it's like telling someone some story and after about 10 minutes they...hang themself (F and S laughs). But they start to say: you know, I get the idea of that, do you know what I mean? And that's really - when **you're playing music to an audience, you've got to be aware of them,** monitoring & awareness of audience and I think, and I was sort of mentioning that systematic music service thing that kind of almost knocks...you know, realise...is quite happy to knock them down. Yet they're forgetting the most important thing, which is that: are their musicians going to communicate? **Communication through movement of ideas** GUIDING MUSICAL PRINCIPLES AND BELIEFS how you put notes together

F: Yeah.

(37:37) - S's wife comes in to check up and ask about refreshments, etc. S and F takes a break.

(44:08) S resumes a conversation: I mean, you do **obviously partly analyse why you're doing something, but to the extent**, do you know what I mean? (general analysis)

F: Yes. (S and F prepare to continue listening to the clip)

(44:53) - S and F listen to loud D major Section (nearing peak and ending. Clips ends)

F: I was wondering at what part in the improvisation did you become - because you said you were kind of still conscious - when did you really let go, and were just comfortable, and forgot I was here, actually, and forgot this was recording?

Mm. 21 in music – he is thinking more, hence gaps in music.

ESTABLISHING FLOW: ATTENDING TO PHYICAL AND MENTAL ASPECTS

Reaching for the peak experience: attempting higher heights, going further

S: Um...well I think...I suppose when I said "I'm going try to take it a bit deeper" and probably a further step then I would've been, **playing purely on brain rather than**...shutting out most senses I mean, I tend to close my eyes, because the thing is, any distraction at all, even finding out what notes you're playing can be a **distraction**, because you're **looking** rather than feeling what's happening. And probably the bit where I said I'll try and take it down to another slightly more deeper level, probably that one would have been the...Distraction from senses ATTENDING TO PHYSICAL AND MENTAL ASPECTS OF FLOW – reaching peak experience

F: But you talked yourself into it, or did you hear something and felt...how did that happen?

ESTABLISHING FLOW: ATTENDING TO PHYICAL AND MENTAL ASPECTS

S: ...**I purposely made myself think of something that made me feel emotional.** Intentionally imposing an imaginary situation, **living the self narrative (conclusion)**

F: So it's a technique that you can use to put yourself into...

S: Yeah. **Oh absolutely. It's like acting**, I suppose. It's like, if you're going to play somebody who's just lost a loved one, and you're thinking about a great rock band you saw last night, it's not going to happen. So **you have to literally think about something that is very upsetting in your life, and then put yourself in that place**. And then you probably automatically forget about what's going on around you, and you suddenly start changing your whole body language, and tears...do you know what I mean. So it's probably, yeah, and you can certainly do that. Shutting out the senses, focusing on feelings, living the narrative

F: And you said it reminded you of a rock song? What rock song was it? How did you... or a popular song?

S: Yeah...

F: Is that a way that **helped you to memorise**?

S: Yeah, oh god yeah, oh absolutely. **There's a song called**...by two people...it's what reminded me of**..."Answer me",** which is something like (plays piano)..can't sing very well. (sings "Answer me, Oh my love..." with the George Shearing tune and exact harmony).

F: Really?! That's what it sounds like?

S: Yeah, it's like (sings: Answer me, Oh my love, Just what sin have I been guilty of.... in the same rhythm and melody).

STRUCTURE OF LEARNING AND REPRODUCTION

F: No way! It's verbatim!

S: Yeah! And then it's (sings phrases 3 and 4) : Tell me how I came to lose your love...please answer me...

F: So maybe George Shearing didn't make that up! Maybe that was...

S: Well... maybe he did it first. Actually no, because someone did it ages ago, and then Barbara Dickson, I think, did it in the early 80's or the late 70's, and that was a cover of an older song.

F: Oh my, so...this is the song! (laughs)

S: It could be. When was that (GS's recording)....?

F: I don't know...I'm guessing at least 1990s.

S: Oh my god, well in that case, even the cover of the one I just did is late 70's.

F: Well okay, George Shearing most likely....okay, I thought he just played it.

S: Yeah (laughs) Probably he's just taken that as an example to then improvise on, do you know what I mean?

MULTITASKING / MONITORING

F: How do you know when to end a piece, or continue into these climatic points? You could have gone on forever, but you decided to end it after the third or second big climatic event...

S: (laughs) I think, you know...I mean even then it will sort of be different every time. It **depends what mood you're in.**

F: But in this context.

S: In this context...I would probably have thought: That will do now, you've probably had enough of this! (laughs) Saturation of ideas, monitoring

F: That's it? Oh, it wasn't anything musical that said: Oh logically, I would...

S: I suppose after I did the bit where I thought: **"I can fight this and get through it"** (plays a variation of that part on the piano). That bit...the I just thought: Yeah, okay, **I've got the drive to carry on, so that's dealt with, and it's the time to stop worrying about that, if you'd like. I would probably have subconsciously (thought): story told, if you like.** But it's only you asking me, that I'll now analyse it and think why I've done it. Resolution of ideas

F: Sorry to ask...but that's really what I want to get at. And did you have anything that came up as a surprise? Well obviously, the whole thing is a surprise, but to what extent did some of the things you've used were already familiar to you and does.. did something surprise you?

S: Yeah! **Probably that bit that went kind of a bit flippant**, I wasn't really expecting it. Dealing with offhand yet surprising ideas

F: Towards the beginning you mean?

S: Well, I think it was in the middle and it sort of went...(**plays the triplet development Section in D major**)

F: Oh where you said that you'll just let go and play around? EXPERIENCING FLOW PEAK

S: Yeah, just (forever) and I thought: Oh! But **that's the funny thing, you know, 'cause you think: Oh, I wasn't expecting that.** But this is what I say to my students. I say: You know, when you're there upon a stage, and you're playing what I've taught you, what will start to happen, is something takes over your body and you start doing things, and you think: "I can't do this, I've never done it before! I can't do it, but I'm doing it!" I composed a stage musical, and we sourced local people and students for it. And we had all rehearsed it for quite a long time and they were very good. The thing is, when we put it on stage, they suddenly started performing things that they were not even capable of doing. I mean there are students that - and even --- (S refers to his wife) - some of the students were her singers, she said: "She can't do it! She's never done it before." And the same with some of mine. I thought: No, that is not normally in their capacity. But you see, what happens is, **you get the inspiration, you get the adrenaline, and it's like something takes you over and does it on its own. It's the only way you can describe it.** Adrenaline takes over And what you find with improvising is, you almost take a step back and think: Oh, I think I'll just let my hands do this because I don't know what's happening, and they're doing it on their..." so it's a bit stupid, doesn't it, and it sounds like some kind of fairy..."like yeah, like that really does happen" . **But actually that is the way improvisation - when you're totally at one with the emotion, being relaxed, and you've got a - like you said - some kind of spur, making you do it. And that's when you start going: What am I doing? I don't normally do that.** But it's when - people say sometimes - 'perfection', they want perfection to be when just play all the notes perfectly. And i say: but how is that perfection? That's just a technically correct performance; it's not perfection. Perfection is where the audience can hardly breathe, and they've got their head in their hands and it's only music that you're playing. You're not doing anything else, **you're not putting horrifying images in front of them** or anything like that. Work to put images in audience And they're like starting to cry, or you know...and when we do (show up and ??), people poured put emotion from somewhere in the singing and in the music, and I sort of did, like you said, I gave them that impetus with an emotional thing here to pull it out. And in fact, the biggest comment that we got, which was like literally unanimous, was that people said we were so emotional all the way through. And in fact what they said was, they thought it was going to be like a school play, and it ended up totally forgetting what it was, but only knowing that at bits they were crying and then sort of thinking...which is the - you know, what you were basically going out to achieve, and well, if you don't achieve that it's not a musical anyway. But that's just in the music - you can achieve that just in an instrument and nothing else, no one's saying anything and no one's acting.

(F mentions about forgetting a question (56:20) she wanted to ask S, before remembering and asking to borrow a piece of paper).

F: Can I ask you to draw something? I want you to draw what you heard in the piece that you memorised. And then, one half (of the page) is what you've heard before, and the other half - what you did with it in your improvisation, if it's possible.

S: Okay. And would you want me to draw that in picture form, or...?

F: Ideally elements that you heard...

S: So, I don't write anything**, I draw an illustration**, is that right?

F: Mmm, yes, like lines, circles, or whatever.

S: Okay. So I would hear...so am I going to sort of use just objects like circles, or like an actual teardrop, or a smiley face, or....

(F and S set up for the drawing).

F: Whichever is easier. **Something that would help you to remember what it was**. I could play the clip for you again if it helps this.

S: And is this...am I drawing the one that's actually on there as well, or just my improvisation?

F: Both. So first I'll have you draw how you approached understanding (memorising) the tune (plays the clip). Yeah, how you understood it.

S: (listening to clip and starts drawing) I mean, I would say, you know, to me, it's a **standard I-IV-V** harmonic progression. But how would I sort of write that, and...very **simplistic, obviously**. **Light, nothing too heavy**...1) Conceptual mapping, 2) 3) Judgment of features (basic), Emotional association

F: Right, yeah, that's great! I mean, if you could...this is all an experiment, so you can (feel free)...

S: **Put that into an illustration**...Oh, okay. So let's say, to me that's a...well, at the moment I'll just put **the first things I thought, which was I-IV-V**. Erm...simplicity of it, really. I mean, I've just drawn a square, just a standard square there because I think, well, that's something that's fairly - it's in a box, isn't it really? (hums)... Use of audiation **three chords**, it's the **obvious primary chords of western music**, Counting and grouping of sounds, placement of genre it's all totally in a **box**. Abstract distillation So erm (**sings part of phrase 3**)...I'd probably say a box, a square, then with a...(hums again)...**a few little nuances of...something sweeter really**. Addtional changes to basic concepts are emotional So I'd probably say that it's mainly a square box but with some kind of sweetness coming from it.

F: And the box represents...?

S: A very standard chord progression. You know, the most primary westernised chord progression. So, **there's a few minors creeping** in so I'd just do a...(plays a soft chord in LH) it's very tricky isn't it, but **we did say a rectangle**, **there's a slight variation with a minor coming in there**. And then I suppose, just a **very predictable ending, so another square probably** (laughs).

F: Ah, so it's like a very predictable beginning with a very predictable ending, a typical I-IV-V-I?

S: Yeah. with just a little bit of a **cheekiness** in the middle. (maybe the b iv chord? And the melodic ornament) (laughs). Generally, yeah.

F: And from your, from what we heard of your improvised take, what do you think you did with that, visually?

S: Ah...right.

F: You could use the box you drew.

S: Yeah. I mean the thing is, it's supposed to be **simplistic,** that is, isn't it. Because **that is what it is to say "this is simplistic, it's just that." "Now you do something with it,"** is

more...so I suppose you would say **there's a box that you were given**. Need to add to the original So you use that to start with anyway (starts drawing on other half of the page). Then you'd probably just start to...so if you could **put an arrow to say that perhaps there is a little bit of variation in the bass**. Awareness of harmonic deviation for each variation So I mean...Then when it goes on to the **'deeper bit'** you know...you would probably have...(continues drawing in silence).... Major Section boundary established by depth in material development

F: (peers over) wow, that is so cool! (S laughs, keeps drawing). And you really remember quite in detail how it went, because it's very detailed, the drawing.

S: Yeah, I suppose! Um, and then here (continues drawing)...

em, I'll need to carry on to the other side there...(flips page over to continue drawing. laughs)...continuation...(laughs)...my drawing is not very good.

F: No, it's all about, there's no rule, I think it gives another dimension to how you think...

S: Yeah, yeah, it does, right. I've never actually tried to illustrate this.

F: I'm not imposing any rules because no one's done this before, and I'm going to ask for your feedback about this kind of methodology, and what you would recommend instead?

S: Yeah! I mean, **illustrations are quite, you know, they're very good.** But then...(continues drawing, nearing the end of the improvisation. Finishes. Smiles and hands over drawing).

F: Oh, that's the ending, I know, that's the ending! Cool, okay.

S: Yes (laughs). (Starts explaining (1:05:24) his drawing). So what I thought (starts to refer to his drawings)...obviously, that's just theirs (referring to original drawing of clip). Square box, slight variation. Then I said, **a bit deeper**, **romantic**, **stars**... deeper development of improvisation corresponds to intensity and more new variables

F: That's where you started getting comfortable, right?

S: Yeah, **into just thoughts there**. So, **kind of romantic and sort of, love, beauty**... Abandon of senses, focused on abstraction of romance, love, beauty

F: Checkmarks means everything's okay? Or...something like that?

S: Yeah...yeah, you know, sort of**, light, nothing sort of gripping/dripping or hanging** on there. Here, **down to a deeper - couple of tears**. I mean, I've just done that...uh...**anxiety, blackness (pointing to the black box)...** iconic and conceptual symbols associated with emotions. Corresponding deep with physical depth, Heaviness associated with darkness.

F: blackness...

S: Yeah, I mean, **I didn't go too deep**, actually in that one, did I? (referring to improvisation). But **it would have gone darker**, shall we say, but just to....so, darker, and thinking: **I can't sustain this, and then, that positive thing has kicked in there, so it's right, I can do this** (gestures positively and determinedly a few times)...**up the steps...** Potential of development direction, choosing a different direction, Positivity associated with ascension, iconic representation of upward movement, personal strength featured

F: They're like stairs? Ah, okay... you're using metaphors.

S: Yeah...I can do that. Well, yeah, I haven't done this before, obviously. And then here (gestures towards end of drawing), comfortable, I mean, I've put **a few Z's** there...**comfortable**...Stillness associated with peace and comfort. Resting in peace, a resolution I suppose that is just saying that you've actually **conquered** that Conquered with happy face, and that now you're comfortable with the fact that that's happened, and that you can actually continue to **blossom** again **without being dragged down by this (pointing to black box**). Blossom lightness at top juxtaposed with heaviness and darkness at bottom. And then just **tailing off** a thinning and tapering of texture, applying musical inertia movement to a resolution that's a peaceful one. You know, you've **come through** something. Living through a journey

F: That's fantastic. What's this? (points to stairs part of drawing)

S: Sorry, those are (laughs)...those are supposed to be **feet walking up**, actually (corrects/emphasises over the drawing with his pen)...yeah...A step at a time, building up energy

F: Oh, okay, thanks!

S: Yeah, you know, **square shoes**, I don't know why they're square shoes....

F: Well because started with the square things (boxes in the beginning)? ....Oh nice...That's fantastic. (takes the drawing) thank you. Um...can we do a few more? This is really cool.

S: Yeah! Yeah!

F: I'll do another short one. This is, well, they're all short really. The next one is called....it's by a composer, it's called 'Faith in Donkeys'.

S: Wow, that is abstract.

F: And...I think the donkey part will become apparent...I don't know if it helps to tell you the story but...or maybe I shouldn't have influenced you...

S: Oh...yeah, it does, definitely, absolutely! I'd rather have a picture, to be honest.

F: Really? You'd rather have something to work with, instead of given nothing, like: Oh, just improvise?

S: Mmhm! Of course! Well, absolutely. I mean if someone gives me a picture, then yeah… that's great for me…

[End of Transcript]

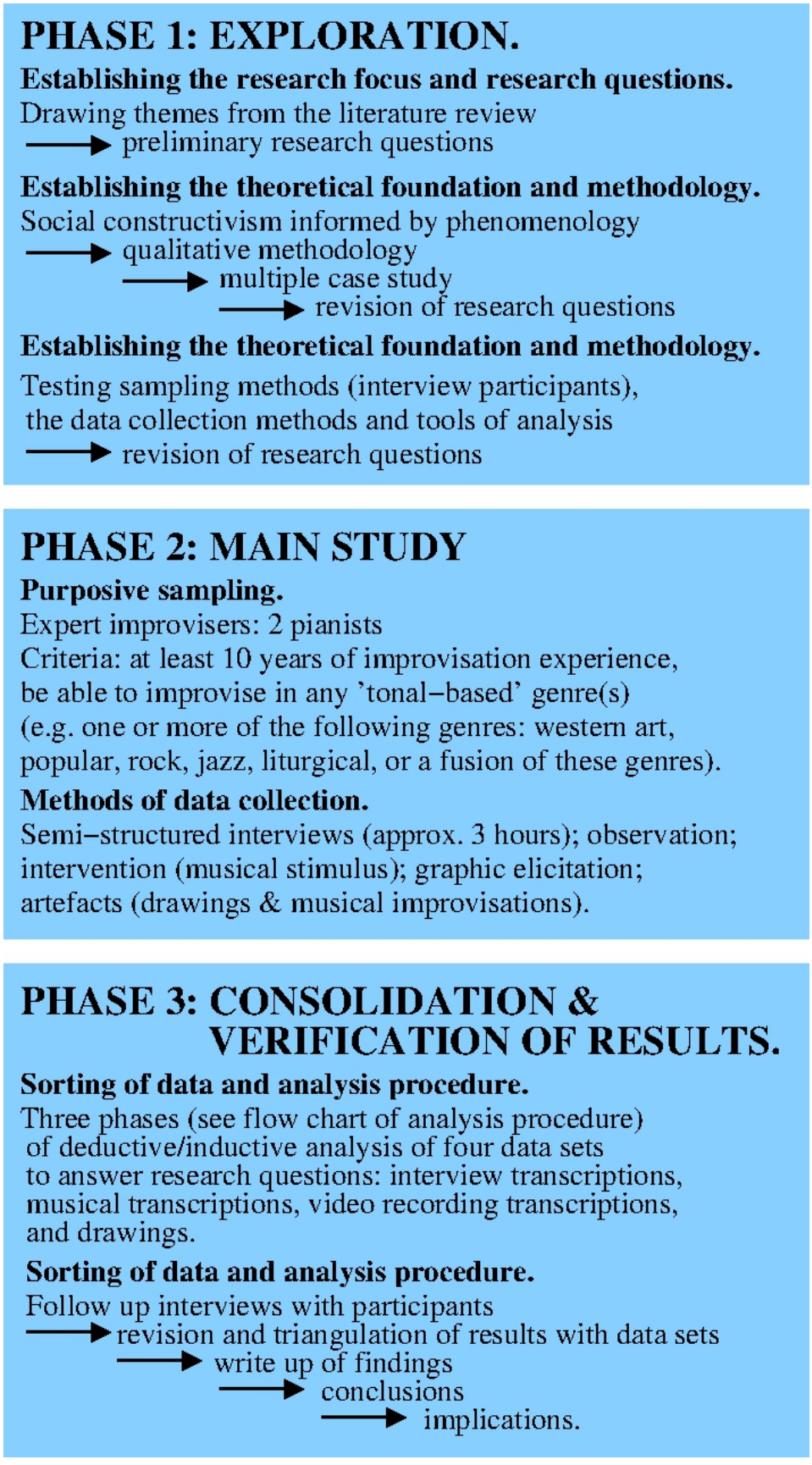
Appendix F: Music tracks

1. Musical Stimulus

2. Improvisation by Stuart Jones

3. Improvisation by Ron Drotos

Appendix G: Diagram illustrating research design



Appendix H: PhD main findings and conclusions

Key Literatures	Research Questions	Findings Across Two Improvisers (2 Cases)	Discussion	Conclusion
*Godoy, 2001 *Pressing, 1988 *Clarke, 1988 *Lehmann, 1997 *Pressing, 1988 *Pike, 1974	Overarching: What characterises the nature of professional improvisers' perceived mental representations before, during, and after a thematic musical improvisation?	**MR Characteristics Across All Four Phases** 1) Six meanings evidenced (Leman, 2010) 2) Four types of MR formations evidenced 3) Three MR roles evidenced (Lehmann, 1997) 4) Twelve different types of MRs identified	**Key features of Improvisers' MR:** 1) Multiple meanings 2) Multiple formations 3) Multiple types of roles	Improvisers' mental representations are **multi-various.**
*Leman, 2010 *Pike, 1974 *Pressing, 1988 *Berliner, 1994 *Clarke, 1988	**(1)** Drawing on Leman's (2010) framework of "embodied approach to music semantics", how are meanings implicated in the formation of mental representations?	**MR Formation Characteristics in Each Phase** ***Learning*:** Production MR with 4 meanings ***Ideation*:** Goal & production MR with 2-3 meanings ***Improvisation***: Goal, production, and reflection MR with 1-2 meanings ***Reflection***: Reflection MR with 5-6 meanings	**Improvisers' intentions form MRs. Meanings are then produced from MRs and shaped in four ways:** 1) Meaning construction 2) Meaning development 3) Meaning revision 4) Meaning expansion	Improvisers' mental representations undergo **progressive and distributive** formations
*Lehmann, 1997 *Clarke, 1988 *Pressing, 1988 *Pike, 1974 *Norgaard, 2008 *Davidson & Scripp 1992 *Berliner, 1994	**(2)** How is Lehmann's (1997) model of "acquired mental representations in music performance" evidenced in terms of the roles implicated in their improvisations?	**Roles and Types of MR Used in Each Phase** ***Learning*:** production (*progressive-recursive*) MR ***Ideation*:** goal (*idea, strategy*) production (*adaptive*) MR ***Improvisation***: goal (*strategy, communication, inspirational*), production (*simulated, instinctive, adaptive*), reflection (*self, social, performance*) MR ***Reflection*:** Reflection (*progressive*) MR	**Different Types of MR Identified Across 3 Roles** -4 types of goal MR -4 types of production MR -4 types of reflection MR	Improvisers' mental representations take on **multiple types of roles**.

Appendix I: Table of potential journal articles

Journal Article Title	Journal Name
"Mental Representations" as Improvisers' Constructions in the Understanding of Their Experiences During Musical Improvisation	Psychology of Music
The Role of Musical Semantics in Understanding "Mental Representations" in Contemporary Models of Musical Improvisation	Music Perception
A Multi-Level View on Mental Representations in Contemporary Models of Musical Improvisation	Contemporary Music Review
The Use of Music Elicitation in Musical Improvisation Studies	Critical Studies In Improvisation
The Use of Graphic Elicitation in Musical Improvisation Studies	Critical Studies in Improvisation
A Phenomenologically-Informed Methodology for Multiple-Case Study of "Mental Representations" in Musical Improvisation Featuring Lehmann-Leman Inspired Analytical Framework	International Journal of Music Education
Uncovering "Mental Representations" in Musical Improvisation Through the Use of Observations, Interview and, Music and Graphic Elicitations	International Journal of Music Education
A Two Participant Multi-Modal Study of Mental Representations in Musical Improvisation	International Journal of Music Education
Meaning Implication in the Formation of Mental Representations in Musical Improvisation	Psychology of Music
The Role of Acquired Mental Representations in Music Performance	Psychology of Music
The Nature of Improvisers' Perceived Mental Representations Before, During, and After a Thematic Musical Improvisation	Psychology of Music

Appendix J: List of workshop, paper, and poster presentations

Poster presentations:

- A Multimodal Framework For Analysing Improvisers' Perceived Mental Representations. *National Association for Music in Higher Education Annual Conference*. Faculty of Education, University of Cambridge. 2 May 2017
- *Really* looking at Mental Representations in Musical Improvisation. *Advancing Creativities Research: Making Connections across Diverse Settings. A British Education Research Association (BERA) Creativities in Education One-Day Conference*. Faculty of Education, University of Cambridge. 28 October 2016
- Mental representations in harmonic-based musical improvisation. *Kaleidoscope Graduate Student Research 2014 Conference*. 29-30 May 2014

Paper presentation:

- Mental representations in tonal-based musical improvisations: phenomenological case studies of expert improvisers. *Research in Music Education 2017 Conference*. Bath Spa University. 23-28 April 2017

Slide presentation:

- Using The Arts To Present Research Results: An Arts-Based Study Of Expert Improvisers' Mental Representations Through Music Improvisations And Drawings. *Featured work in lecture by Professor Pamela Burnard: Arts-based' and 'STEAMed' research approaches: InterSections of interdisciplinary research with visual and performing intercultural arts practices*. Homerton College, University of Cambridge. 22 November 2016
-

Showcase co-organiser:

- Illuminating multimodality in educational research. *Kaleidoscope Graduate Student Research 2015 Conference*. Faculty of Education, University of Cambridge, 29 May 2015 (see Appendix M)

Workshop co-organiser:

- Thinking about improvising, and thinking inside improvising: classroom playfulness. *Homerton College, University of Cambridge*.15 November 2013 (see Appendix L)

Appendix K: Abstract of paper presentation at RIME 2017

Mental representations in tonal-based musical improvisations: phenomenological case studies of expert improvisers

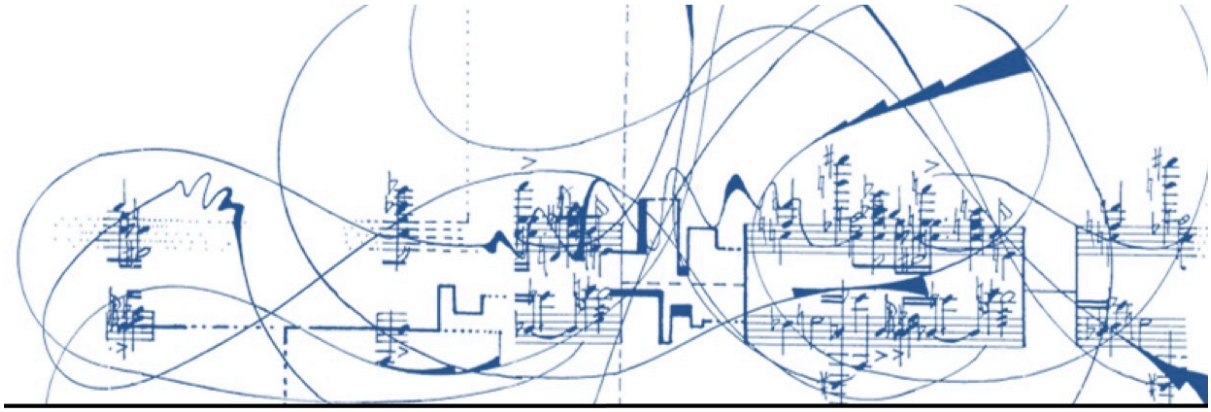
Abstract

'Mental representations' are recognized as having a pedagogical importance in increasing the quality of a musical performance, yet its nature and roles in music learning remain poorly understood (Dalagna et al., 2013). This nearly completed doctoral study presents a phenomenological enquiry of expert improvisers' mental representations. The aim of the study is to conceptualize the nature, formation, and roles of mental representations in the context of the musical improvisation process.

Mental representations are generally understood as conscious and quasi-perceptual experiential phenomena involving the imagination of events, objects, and settings. German music psychologist, Andreas Lehmann-Wermser (1997), among others, has proposed that there are three necessary types of mental representations in an expert musical performance. These include mental representations of: 1) the desired performance goal, 2) the production aspects, and 3) the actual performance. Music scholars, however, have found mental representations difficult to conceptualize due to the coexistence of its different names and definitions in the literature. As such, scholars Terry Clark and Aaron Williamon (2011), among others working in the field of performance science, have argued for the need to establish a consensual definition of 'mental representations' that is transversal to all performance domains.

In this presentation I will clarify seemingly synonymous terms of 'mental representations' that feature in several musical improvisation models. In particular, the present study critically reexamines the concepts of 'tonal imagery' (Pike, 1974), 'representational structures' (Clarke, 1988), and 'analytical representations' (Pressing, 1988) from several phenomenological and psychological improvisation models. I will offer insights into the role of mental representations in higher music education settings. In addition, I will share some of the innovative methodological tools that feature in this work, where the analyses of interview and observational materials are combined with other types of data, such as music performances and drawings.

Appendix L: Poster for improvisation workshop



Thinking about Improvising, and Thinking Inside Improvising: Classroom Playfulness

a workshop with Jennie Francis and Frances Shih

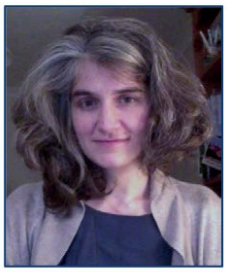
This will be an **improvisatory workshop** on improvisation that draws on three key ideas:

1) what you have got

2) stimulus, and

3) how you respond in the moment

...which will be explored through **playful story-telling and music**.



Frances Shih is a PhD student studying with Dr. Pamela Burnard at the Education Faculty. She draws on her interests as a teacher and pianist to study how improvisers understand a tune before they improvise on it.

Having taught music in a secondary school for fourteen years, **Jennie Francis** is studying meaning-making in music lessons. She also works as a seconded mentor for the secondary PGCE music course.

PLACE
Pedagogy, Language, Arts & Culture in Education Group

UNIVERSITY OF CAMBRIDGE
Faculty of Education

Friday 15th November
5.00pm – 6.00pm

Paston Brown Room
Homerton College
Hills Road, Cambridge CB2 8PQ

A **Homerton Creativities Series** Seminar.

All welcome.

RSVP to Lucian Stephenson (**lms56**)